

C-46 Commando in action



Don Greer

Aircraft Number 188
squadron/signal publications

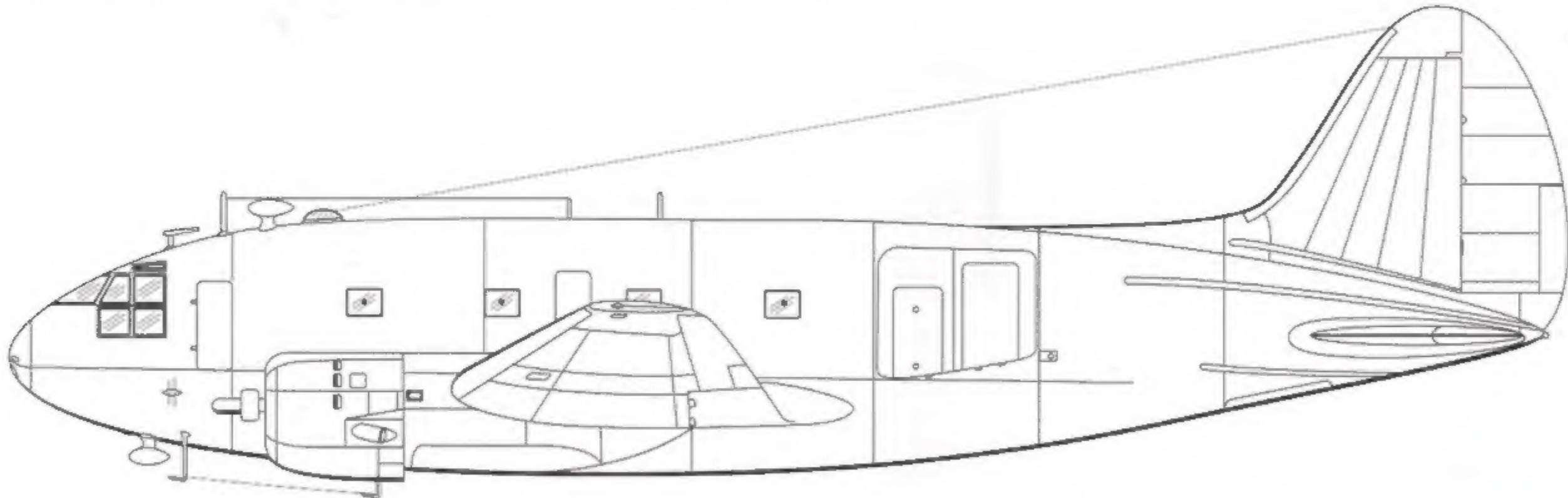
C-46 Commando

in action

By Terry Love

Color by Don Greer

Illustrated by Dave Gebhardt and Darren Glenn



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A Curtiss C-46A-45-CU Commando (42-96569) flies over the Himalayan Mountains while on a supply mission between India and China in 1944. This aircraft was assigned to a combat cargo squadron of the Air Transport Command (ATC), US Army Air Forces (USAAF). The C-46 was the most used transport aircraft for flying over 'The Hump' to resupply Allied forces in China.

Acknowledgements

I would like to thank my wife, Carol, for her patience. Also, I want to thank my good friend, Rick "Mr. C-46" Wargo for his enthusiasm and assistance. I am especially appreciative of Louis Eltscher and Gerry Balzer, whose early C-46 data and information were invaluable.

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Dedication:

This book is dedicated to all of the C-46 crew members that did not come back, especially to the "Hump" crews who risked everything, almost daily, to supply China in her hour of need.

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ISBN 0-89747-452-X

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A Curtiss C-46A Commando (41-24703) cruises above the clouds in 1943. It is painted in the standard US Army Air Forces (USAAF) camouflage scheme of Olive Drab (FS34087) upper surfaces and Neutral Gray (FS36173) undersurfaces. The undersurface color often extended halfway up the fuselage sides on C-46s. The Insignia Red (FS31136) outline on the national insignia was authorized during the early summer of 1943, but this was replaced by an Insignia Blue (FS35044) outline later that year. The Commando hauled vital supplies to every theater of operations during the war. (Dave Hansen)



Introduction

The Curtiss-Wright C-46 Commando was one of the more controversial aircraft of World War Two. It operated under the shadow of the great Douglas DC-3/C-47, although it was really a partnership. The C-46 gave reliable service throughout the war and later conflicts, although it often had to operate at the extremes of its performance, especially in the China-Burma-India (CBI) Theatre of Operations. In tribute to its capability, the C-46 continued its wartime military service into the Korean and Vietnam conflicts – long after the end of World War Two. Additionally, the Commando became a reliable transport and cargo aircraft in the post war world; some civilian C-46s are still flying in remote and rugged corners of the world, especially in Alaska. Approximately 60 aircraft are still operating and flying cargo. This is a pretty good record for an aircraft designed over sixty years ago.

The C-46's origins can be traced to a series of events transpiring in the early 1930s that had a significant effect on the development of commercial aviation in the United States. The Curtiss Aeroplane and Motor Company, originating with Glenn Curtiss, and the Wright Aeronautical Corporation, formed by the Wright Brothers, merged to become the Curtiss-Wright Corporation. A few months later, the Great Depression hit and the aircraft market crashed. Instead of investing money in new designs, Curtiss just barely and slowly modified their existing designs – a practice that required little new investment. Curtiss built a series of fighter aircraft for the US military that were primarily based on designs of the 1920s.

Curtiss was a major aircraft producer in quite a few different airplane markets. By 1933, competitor Douglas Aircraft had flown and developed the DC-1 all metal airliner (two 760 HP Wright Cyclone R-1820 engines, 15 passengers, and gross weight of 16,800 pounds/7620.5 kg). Competitor Boeing had developed the Boeing 247 airliner (two 600 HP Pratt & Whitney R-1340s, ten seats, and a gross weight of 13,650 pounds/6191.6 kg). Being a major aircraft manufacturer, Curtiss-Wright did not want to be left out of the modern transport market. Therefore, the firm began initial studies for a modern transport reflecting the latest design trends. In 1933, Curtiss' chief engineer and designer George A. Page went to Europe to study airline transport developments. This trip was made in order to add to the information he had already collected about US airliner developments. Page made several trips, keeping a careful record of his observations and ideas. A number of transport design proposals were studied over the next three years, with a final design emerging in 1936. This was the Curtiss-Wright Model 20, or CW-20, and so designated in April of 1937. Construction of the mockup began in August of 1937, with wind-tunnel tests taking place at the California Institute of Technology (Caltech) between September and December of 1937. Construction of the prototype began at Curtiss' St. Louis, Missouri plant in 1938. Promotional activities for the new airliner began in the meantime and the mockup was exhibited in the aviation building at the New York World's Fair in 1939.

The CW-20 prototype represented an investment of approximately 600,000 man-hours of research and design, plus three years of development, and was the largest airframe design project Curtiss-Wright undertook up to that time. According to Page, it took 100 men two years to do the engineering work alone.

The CW-20 was essentially a private venture. Curtiss-Wright had no firm commitments from any airlines to purchase this aircraft, but the design showed great potential of becoming a commercial success. The company secured letters of intent for 25 aircraft and tooled up for 50 in hopes of securing additional sales. This would have been a significant production run for the time. Curtiss-Wright engineers worked closely with airline representatives in order to produce a transport tailored to airline needs.

The CW-20 was thus conceived as a medium-haul, intermediate range airliner (600 to 800 mile/965.6 to 1287.4 km range). This allowed non-stop service between Chicago and New York, which was one of the more important airline routes. Passenger safety and comfort were a prime consideration. Curtiss designed a large aircraft to provide passengers with comfort, luxury, and spaciousness. Such a design would also have a significant cargo-carrying capability, giving the CW-20 considerable versatility. Economy of operations was also a major factor if the airliner was to be marketable. Therefore, the goal of the Curtiss-Wright design team was to incorporate all of these features into an airframe that would carry the most payload at the lowest operating costs per pound.

The end result was a twin-engine luxury airliner seating at least 30 passengers in a 'first class' configuration with reclining lounge chairs, or 36 passengers in a conventional layout. Additionally, provisions were made for a sleeper version holding 20 passengers. Moreover, Douglas had capitalized on the same idea with the new Douglas Sleeper Transport (DST), which was called the DC-3! The DC-3's success was not lost on Curtiss-Wright engineers.

If the CW-20 was seen as a follow-on design to the DC-3, it was facing much competition. By the time the prototype CW-20 took flight, the DC-3 has established itself as the standard in the airline business. The CW-20 was less forgiving and more complex than the DC-3 and required greater piloting skills. Nevertheless, pilots who mastered the Curtiss transport's intricacies came to really appreciate its greater performance and developed a love for it.

The CW-20 had a wingspan of 108 feet 1 inch (32.9 m), which was 4 feet 2 inches (1.3 m) greater than the wingspan of the four-engine Boeing B-17 Flying Fortress bomber. Curtiss' new transport was 76 feet 4 inches (23.3 m) long and 21 feet 9 inches (6.6 m) high. This made



the CW-20 the world's largest twin-engine aircraft in 1940. Curtiss-Wright selected the 1700 hp Wright Cyclone 14-cylinder, air-cooled, radial engine for their aircraft.

Both economy and safety influenced the decision to design the CW-20 with two engines instead of four. Douglas began to develop their DC-4E four-engine transport to an otherwise similar size and market at approximately the same time. The DC-4E turned out to be a major disappointment. The proposed operating economies were not there and the design's complex systems required excessive maintenance. A re-designed, smaller, and less complex DC-4 later became a great transport. Douglas' experience with the DC-4E appeared to confirm the validity of the CW-20 design. Consequently, the decision to give the CW-20 two engines appeared to be the right one, although it remained controversial at the time.

Curtiss also decided to pressurize the aircraft for passenger comfort, thus permitting high altitude operations above most of the weather. The ideal fuselage cross-section for pressurization is a complete circle; however, such a design would have resulted in an abnormally large fuselage with excessive frontal area and increased drag. The Curtiss designers developed two intersecting circles of smaller diameter, rather than one large one. The upper circle was for the passenger cabin and the lower circle under the floor was for baggage, mail, and cargo. The cabin floor was located at the intersection point of the two circles, thus providing a common chord line. The fuselage depth also permitted the wing spar to pass below the passenger compartment. George Page conceived the idea for the intersecting circles creating a 'double bubble' or figure '8' cross section. It became the basis for all future pressurized airliners of the future, and it is still in use today.

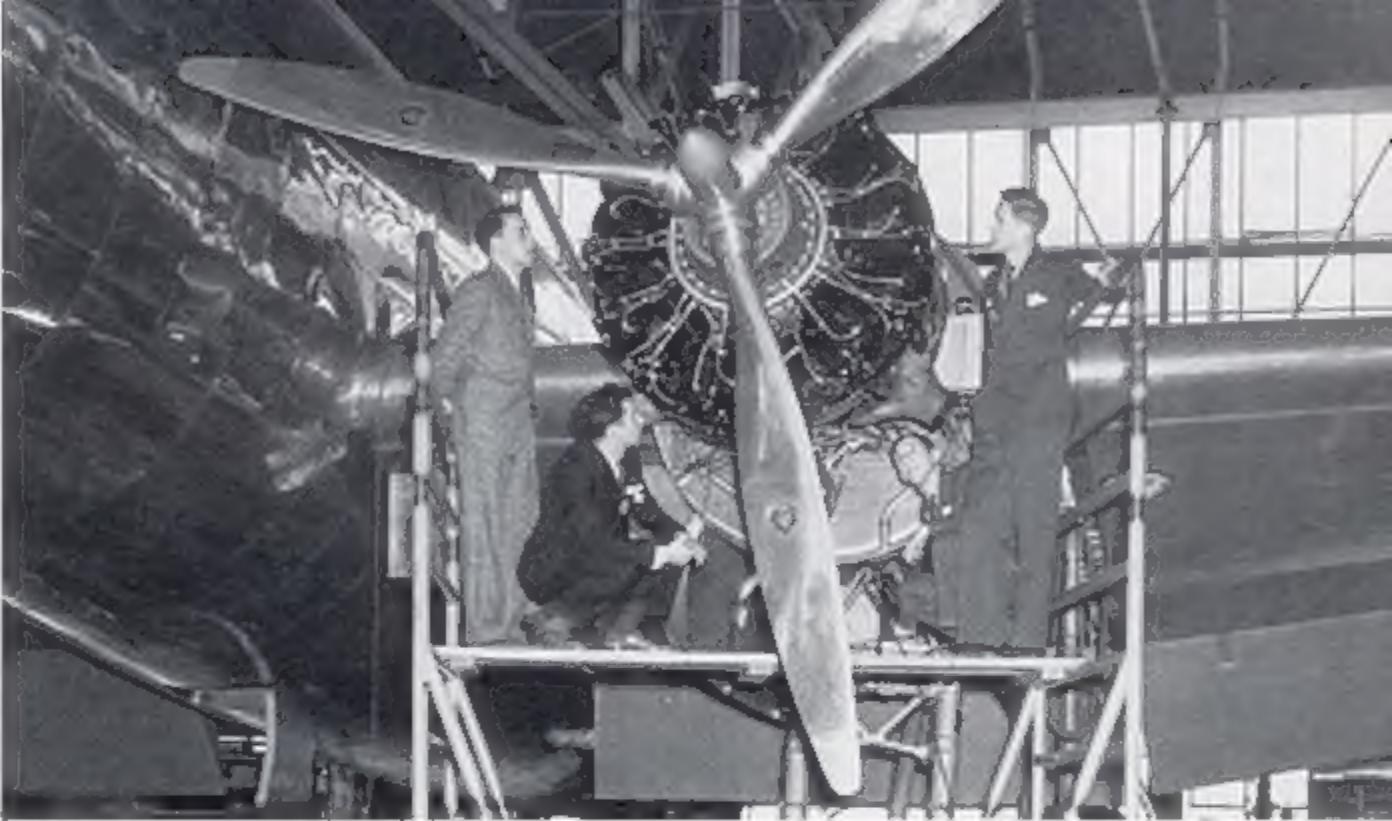
The end result was a cargo compartment under the floor of approximately 455 cubic feet (12.9 m^3) and a capacity of over 5000 pounds (2268 kg), and a passenger compartment above the floor of approximately 2300 cubic feet (65.1 m^3). The spacious passenger cabin measured 6 feet 8 inches tall (2 m) and 9 feet 10 inches (3 m) wide. This allowed sleeping berths to be arranged across the cabin with an aisle off to one side.

Another aerodynamic efficiency was the engine nacelle design. The cowling flaps were only mounted on the nacelle undersurface; no airflow would be disturbed on the lifting surfaces of the upper wing surface. The main landing gear was fully enclosed in the nacelle.

Curtiss engineers took great pains to ensure that the CW-20 would be a safe airliner. It had several features to reduce pilot fatigue by providing a comfortable and convenient cockpit environment. These included power boost controls, large windows, small ground angle, a Sperry autopilot, full-feathering propellers, de-icing equipment, trailing edge slotted flaps, and heavy duty landing gear. Fuel tanks capable of holding 1000 gallons (3785.4 l.) were located in the outer wing panels, as far from the passenger compartment as possible.

Economy, second only to safety, was a major consideration in the CW-20's design. Attention was paid to drag reduction to give higher speed for a given power setting. For example, the CW-20 had flush riveting, butt skin joints, elimination of protruding carburetor and oil cooler scoops, low drag engine cowls, and flush landing gear doors including the tail wheel. In short, the CW-20 was a state-of-the-art airliner with great potential.

Test pilot Eddie Allen – on loan from Boeing – flew the CW-20 on its maiden flight from Lambert Field in St. Louis, Missouri on 26 March 1940. Everything went well on the 90-minute maiden flight, with a test pilot and sales director from Curtiss joining Allen. Flight tests continued throughout the summer of 1940 although there was little publicity about the CW-20. During the test program, the twin vertical tail fins were discovered to be slightly inadequate for low speed flight, especially with one engine out. Curtiss refitted the CW-20 with a single vertical tail assembly and flat horizontal stabilizer by the end of 1940. This change improved low speed handling and reduced production time.



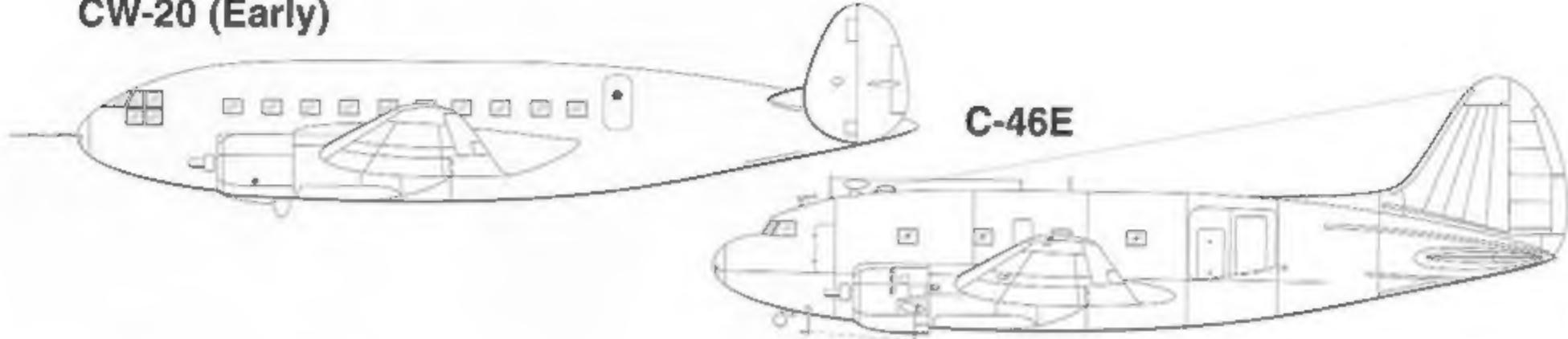
Technicians install the port 1700 hp Wright Cyclone 586-C14-VA2 engine onto the CW-20 in March of 1940. This 14-cylinder radial engine later received the USAAF designation R-2600-17. A three-bladed Curtiss Electric variable pitch propeller is fitted to the Cyclone, although a Hamilton Standard propeller was used on early production C-46s. (Author)

The CW-20 prototype (NX19436) is parked before the American Airlines hangar in St. Louis during the summer of 1940. The original twin vertical fins were inadequate for low speed flight, particularly with one engine out. Curtiss replaced these with a single vertical tail assembly. The prototype's nose probe for measuring air speed data was not installed on subsequent C-46 Commandos. (Gerry Balzer)



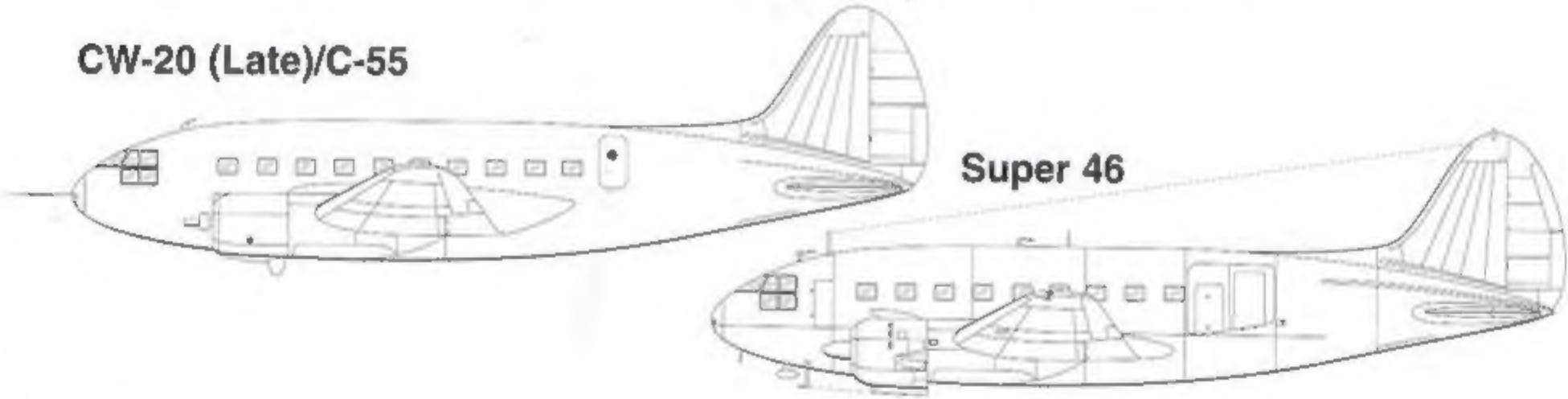
Development

CW-20 (Early)



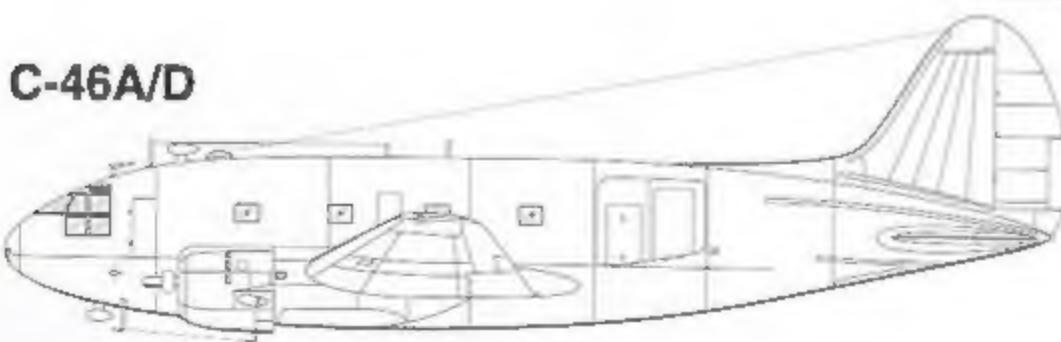
C-46E

CW-20 (Late)/C-55



Super 46

C-46A/D



CW-20/C-55

During CW-20 testing in 1940, the US Army Air Corps (USAAC) took special notice of this aircraft. Major General Henry H. 'Hap' Arnold, the Air Corps' chief, saw the new Curtiss airliner at the Buffalo, New York airport when checking on P-40 Warhawk fighter production that summer. He reputedly commented, "*I want that airplane!*" Curtiss soon had a contract to build 46 CW-20s configured as military cargo transports designated the C-46. The CW-20 prototype was completed on 20 June 1941 – the same day the USAAC officially became the US Army Air Forces (USAAF). The USAAF purchased the aircraft for \$361,556 and designated it the C-55. It was assigned the serial number 41-21041 and the Wright Cyclone engines were designated as R-2600-17s. Curtiss flew the C-55 from Buffalo to Wright Field, Ohio for military testing on 23 June 1941. It was returned to the Curtiss factory in September to permit its sale to British Overseas Airways Corporation (BOAC – now British Airways). It was fitted with 24 seats and long-range fuel tanks, then it was ferried to Prestwick, Scotland via Canada on 12 November 1941. Captain A.C.P. Johnstone flew the aircraft across the Atlantic in 9 hours and 40 minutes. The C-55 – now redesignated CW-20 – was registered G-AGDI and named ST. LOUIS for its city of origin. BOAC flew the CW-20 on long-haul routes, including a regular service between Gibraltar and Malta for a time in 1942. The ST. LOUIS attracted considerable interest in Britain. Its pressurized cabin, soundproofing, thermal insulation, and air conditioning were features unknown to British transports of the time.

The sustained operation of an aircraft built as a prototype, so far from the manufacturer – and the only one of its kind in Europe – spoke well for the soundness of the CW-20's design and the quality of its construction. Availability of other aircraft and growing spare parts difficulties brought about the inevitable, however, and the ST. LOUIS was scrapped at Filton, Bristol, England in October of 1943.

British Overseas Airways Corporation (BOAC) purchased the C-55 in the fall of 1941 and assigned it the civil registration G-AGDI. The aircraft was camouflaged in Dark Earth (FS30118) and Dark Green (FS34079), with Medium Sea Grey (FS36270) undersurfaces. The civil registration is blue with white outline and a red/white/blue band is painted under these letters. (Dave Ostrowski)



The US Army Air Corps (later Army Air Forces) purchased the CW-20 in June of 1941. It was designated the C-55 and assigned the serial number 41-21041. The sole C-55 prepares to take off from Lambert Field in St. Louis in the summer of 1941. The rudder has seven red and six white stripes, with a blue stripe running along the rudder hinge. (AAHS)

BOAC named their CW-20 ST. LOUIS, in honor of the aircraft's city of origin. A large British Union Flag is painted under the windshield. A football-shaped Automatic Direction Finding (ADF) antenna is mounted under the nose, ahead of a pair of pitot tubes located further aft. The CW-20's engine exhausts were flush with the engine cowlings. (Dave Ostrowski)



C-46A Commando

The CW-20's spacious fuselage volume made it an ideal cargo hauler. Curtiss engineers anticipated the new airliner's cargo-carrying potential and made some basic studies of a CW-20 cargo version when planning the design. The military potential of such a cargo transport was most important and the USAAC was extremely interested in it. By 1940, some knowledgeable military people realized that the United States would be drawn into the growing world conflict. The Air Corps desperately needed modern aircraft of all types, especially transports. Except for airliners, the USAAC lacked aircraft specifically designed to haul troops, supplies, and cargo.

Soon after Gen Arnold's visit to Curtiss in the summer of 1940, the firm had a contract for 46 CW-20s configured as military cargo transports and designated C-46 (Model CW-20A). Adapting the CW-20 to military service was relatively simple and required little change, thanks to its sound and well thought out basic design.

The first 25 aircraft of this contract were built to the original CW-20 specifications. More powerful 2000 hp Pratt & Whitney R-2800-43 Double Wasp 18-cylinder, air-cooled, radial engines replaced the 1700 hp Wright Cyclone R-2600 Cyclones. The engines turned three-bladed Hamilton-Standard variable pitch propellers. Although the CW-20 was designed for cabin pressurization, these plans were abandoned. The number of fuselage windows was reduced from ten windows per side to four and the fairing plates covering the double bubble or figure eight of the fuselage were omitted. It was originally thought to be aerodynamically

The first production C-46 (41-5159) flies above the Ohio countryside in the summer of 1942. It is finished in the Olive Drab over Neutral Gray camouflage scheme; however, its national insignia retains the red disc ordered removed on 15 May 1942. A Curtiss P-40 Warhawk fighter flies escort near its corporate stable mate. (Rick Wargo)

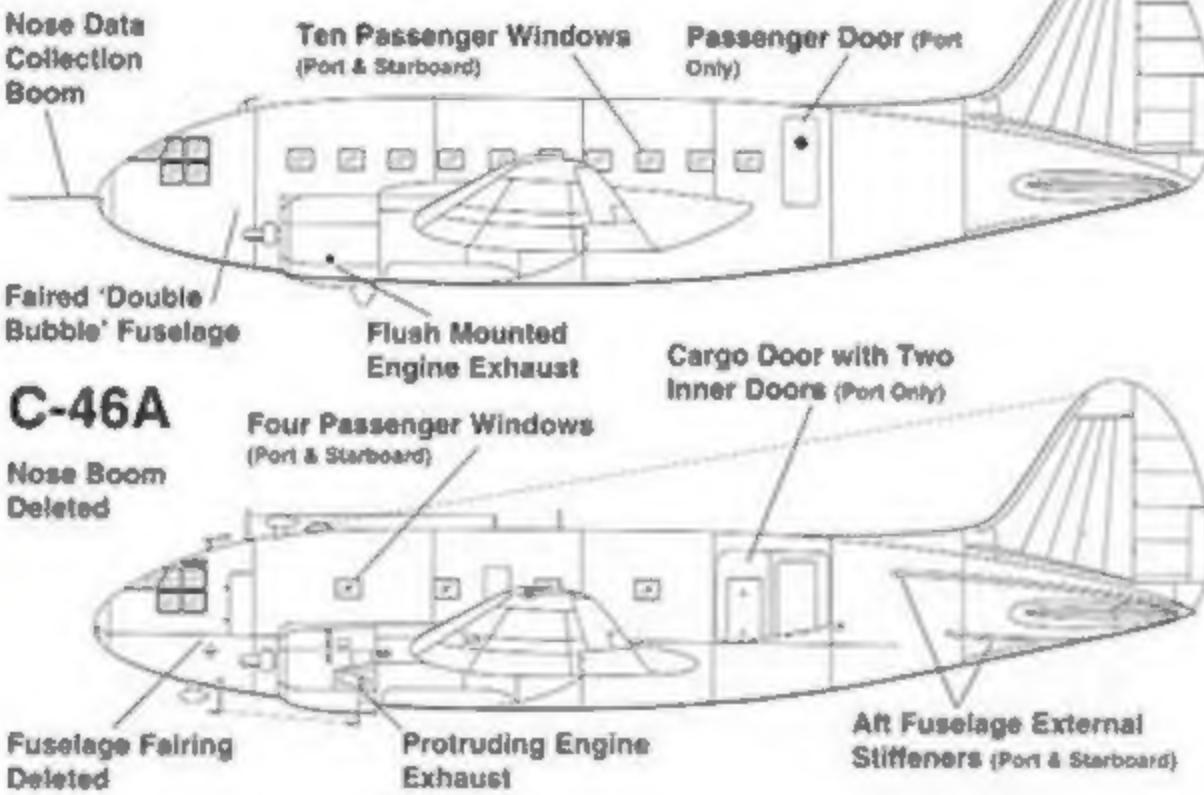
desirable to include these fairings, but tests showed the effect to be almost non-existent. Since they weighed approximately 275 pounds (124.7 kg) and added to both cost and manufacturing time, they were quickly dropped from production aircraft. The Sperry autopilot fitted to the CW-20 was deleted on the C-46. The first C-46 (41-5159) was rolled out of the Buffalo plant on 11 April 1942 and delivered two months later. There was no C-46 prototype, despite the changes from the earlier C-55.

The 21 remaining aircraft on this order were designated C-46As (CW-20Bs) and were more fully adapted to the military mission. The R-2800-43 engines were replaced by the similar 2000 hp R-2800-51 powerplants. An upward-hinged, double cargo door measuring 8 feet (2.4 m) wide by 6 feet 6.5 inches (2 m) high was mounted on the aft port fuselage. Two smaller downward-hinged doors within the main cargo door were used for passenger access. The C-46A was also equipped with a strengthened cargo floor and a hydraulically operated cargo-handling winch above the cargo door. Forty folding troop seats were added to the cabin sides – 20 seats per side. The 48 foot (14.6 m) long cabin had a maximum width of 9 feet 10 inches (3 m), a floor width of 8 feet (2.4 m), and a maximum height of 6 feet 8 inches (2 m). The cargo hold's usable floor area was 348 square feet (32.3 m²).

This aircraft had an all-metal structure, which included a semi-monocoque fuselage. The wing center section had three spars and was flat, while the outer wing sections had two spars and 7° dihedral. The rudder, ailerons, and elevators had fabric covering, while the rest of the airframe was covered by Alclad 24ST aluminum-coated metal alloy. Two pairs of external stiffeners – one pair each to port and starboard – were added to the C-46's aft fuselage. These reduced stresses upon the tail surfaces. A nose-mounted probe used by the CW-20 for test data collecting was deleted from production aircraft.

The C-46A had a wingspan of 108 feet 1 inch (32.9 m), an overall length of 76 feet 4 inches (23.3 m), and a height of 21 feet 9 inches (6.6 m). It weighed 30,000 pounds (13,608 kg) empty and 45,000 pounds (20,412 kg) at normal take off weight. The latter figure was 5000

CW-20 (Late)/C-55



pounds (2268 kg) greater than the C-55's 40,000 pound (18,144 kg) gross weight. C-46s had a military overload weight of 49,600 pounds (22,498.6 kg), which was regularly exceeded on wartime flights.

Both R-2800 engines were supplied with 1400 gallons (5299.6 L) of aviation gasoline located in six outer wing fuel tanks. This was a 400 gallon (1514.2 L) increase over the C-55's 1000 gallon (3785.4 L) capacity. The Commando also had provision for eight 100-gallon (378.5 L) auxiliary fuel tanks in the fuselage. The C-46A had a maximum speed of 270 mph (434.5 km/h) at 15,000 feet (4572 m) and a maximum cruising speed of 264 mph (424.9 km/h). Its service ceiling was 26,900 feet (8199.1 m) and its maximum range with no cargo load was 3150 miles (5069.3 km).

The C-46A could carry 11,700 pounds (5307 kg) of cargo 1700 nautical miles (1957.6 miles/3150.3 km) with full wing tanks. The payload decreased when the fuselage auxiliary fuel tanks were used, but the range increased to nearly 2700 nautical miles (3109.1 miles/5003.5 km) – easily coast-to-coast in the United States. The C-46A's normal crew was three men: pilot, co-pilot, and radio operator. A navigator was often carried for long-distance flights.

The initial 46 aircraft order in July of 1940 was followed by a second contract for 154 C-46As in September, for a total of 200 Commandos ordered that year. A worsening war situation prompted the USAAC to order 256 additional C-46As by mid-1941. Renamed the USAAF on 20 June 1941, the service ordered 270 more C-46As in June of 1942, including 120 for the US Navy as RSC-1s. The USAAF ordered 300 further aircraft in October of 1942 – 40 of these were assigned to the US Navy – and 200 more Commandos that December. During 1943 and 1944, 3250 additional C-46s were ordered on various contracts.

Curtiss owned aircraft factories in Buffalo, New York and St. Louis, Missouri and used a government-owned plant in Louisville, Kentucky. The Louisville facility was built to assemble the cancelled Curtiss C-76 Caravan transport. Huge orders for P-40s, AT-9 Fledgling (Jeep) trainers, and SB2C Helldiver dive-bombers came in simultaneously with the C-46 orders. This situation prompted Curtiss to begin Commando production at Buffalo, rather than the St. Louis plant where the CW-20 was to have been assembled. The St. Louis and Louisville factories soon joined in the Commando production effort. License production of C-46s was granted to Higgins Industries of New Orleans, Louisiana – builders of landing craft and PT boats during World War Two. A contract for 500 C-46As was awarded to Higgins in 1944 and was soon followed by a second contract for 550 more Commandos. Higgins built only two C-46As in late 1944, when the USAAF cancelled the remainder of the orders with this firm.

The C-46As had a great priority for the USAAF and were consequently rushed into production before adequate flight-testing could be accomplished. This resulted in 721 modifications ordered by November of 1943. These included improving fuselage joint sealing to eliminate leaking, repairing faults in the hydraulic and fuel systems, and improved paint that was less prone to peeling. Deliveries were stopped until the modifications were made at the new Louisville plant.

Curtiss developed the use of block numbers to distinguish C-46 sub-variants or post-production modifications. The 21 aircraft completed in the initial contract were designated C-46A-1-CU, as were the first four of the next contract. These were followed by 50 each of the C-46A-5-CU, -10-CU, and -15-CU

variants. Block number differences were significant for maintenance and operational purposes. The designation's final initials identified the assembly plant: CU for Curtiss at Buffalo, CS for Curtiss at St. Louis, CK for Curtiss at Louisville, and HI for Higgins at New Orleans.

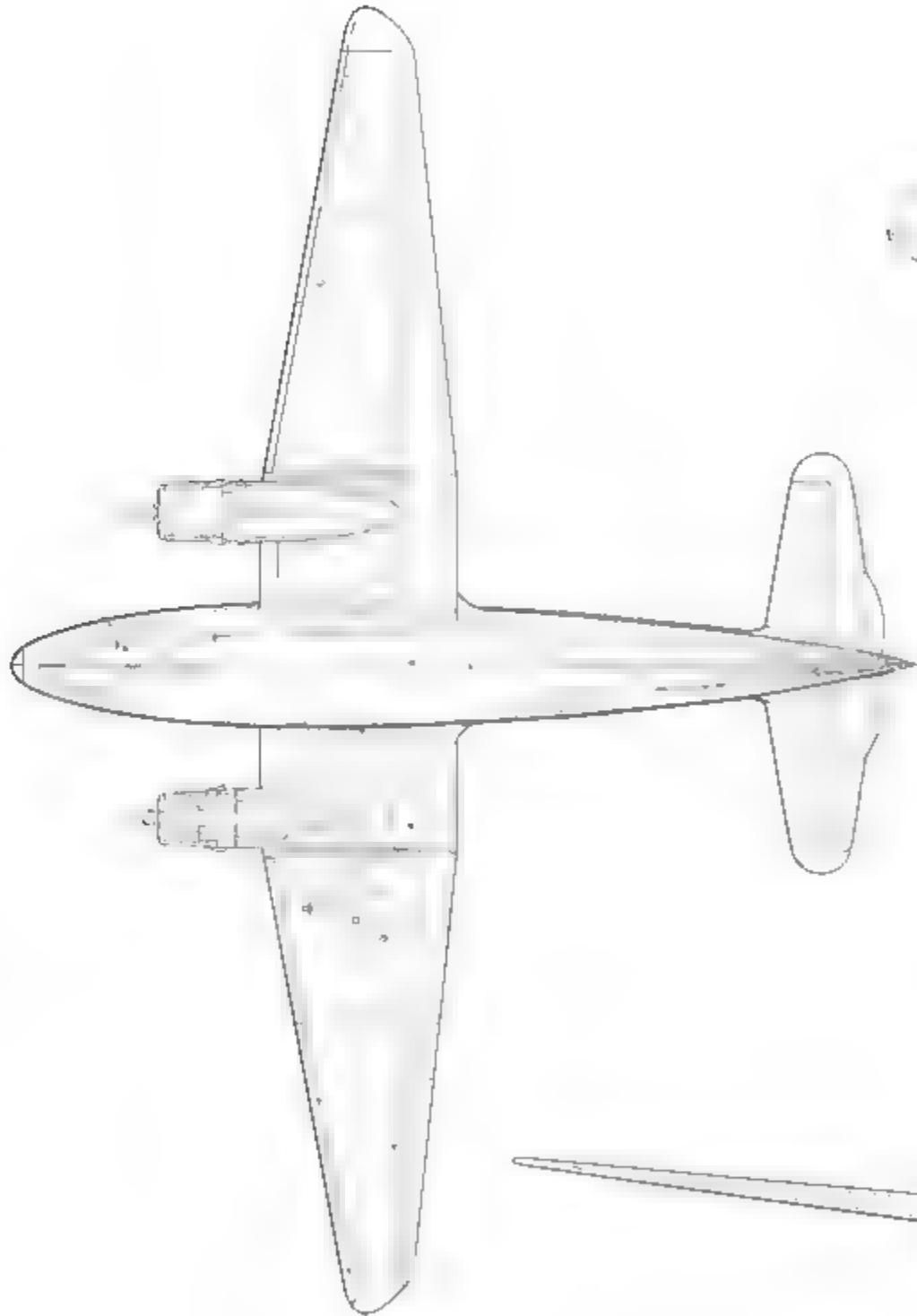
Curtiss Electric four-bladed variable pitch propellers at 13 feet 6 inches (4.1 m) in diameter replaced the three-bladed Hamilton Standard propellers in later C-46A blocks. The Hamilton Standard propellers were used on many other US aircraft of the time and were in short supply. Curtiss Electric propellers were slightly more efficient than their Hamilton Standard counterparts, but proved more troublesome in service. Rudder power boosting was also deleted early in C-46 production. Some later C-46As were powered by 2000 hp R-2800-75 radial engines.

Curtiss and Higgins built 1492 C-46As between 1942 and 1945, making this the most produced Commando variant. This total included 1041 aircraft built in Buffalo between April of 1942 and November of 1944. The Louisville facility completed 439 C-46As between March of 1944 and July of 1945. Ten aircraft were built in St. Louis in April and May of 1945, while Higgins delivered their two C-46As in October and November of 1944. Excluding the CW-20 prototype (C-55), Curtiss Commando production totaled 3180 aircraft and all except four were accepted between June of 1942 and September of 1945.

USAAF C-46s were camouflaged with Olive Drab (FS34087) upper surfaces and Neutral Gray (FS36173) undersurfaces. Beginning in late 1943, Commandos were delivered with natural metal surfaces, due to the decreased need for camouflaging aircraft.

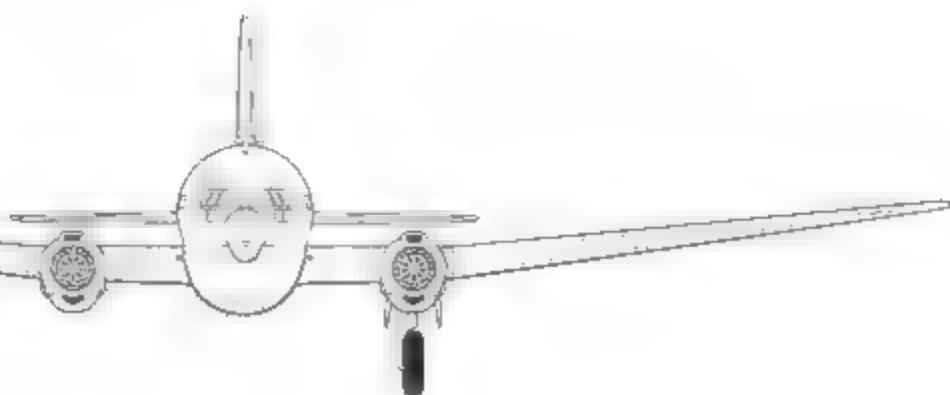
Curtiss workers convert the third production C-46A (41-25161) at the Buffalo factory. An unpainted cargo door was installed for testing a new cargo hatch, which became standard on most Commandos. The serial number's last five digits are painted in flat Orange Yellow (FS3353B) on the upper vertical stabilizer. The flaps fully lowered to 35° when hydraulic pressure bled out from the actuating system. (Gerry Balzer)





Curtiss C-46A Commando Specifications

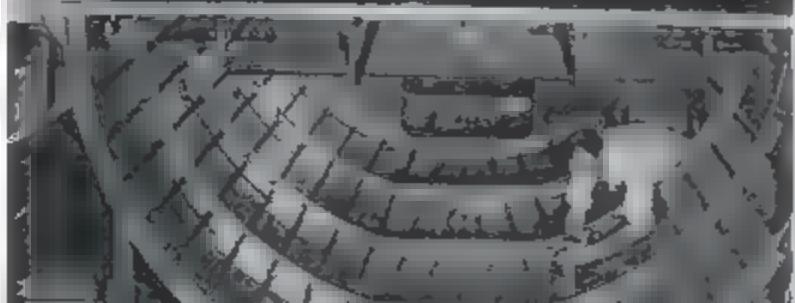
Wingspan 108 feet 1 inch (32.9 m)
Length 76 feet 4 inches (23.3 m)
Height:..... 21 feet 9 inches (6.6 m)
Empty Weight:.... 30,000 pounds (13,608 kg)
Maximum Weight: 45,000 pounds (20,412 kg)
Powerplant:..... Two 2000 hp Pratt & Whitney R2800-51 Double Wasp
18-cylinder, two-row, air-cooled, radial engines
Armament:..... None
Performance:
Maximum Speed: 270 mph (434.5 km/h) at 15,000 feet (4572 m)
Service Ceiling ... 26,900 feet (8199.1 m)
Maximum Range: 3150 miles (5069.3 km)
Crew Three

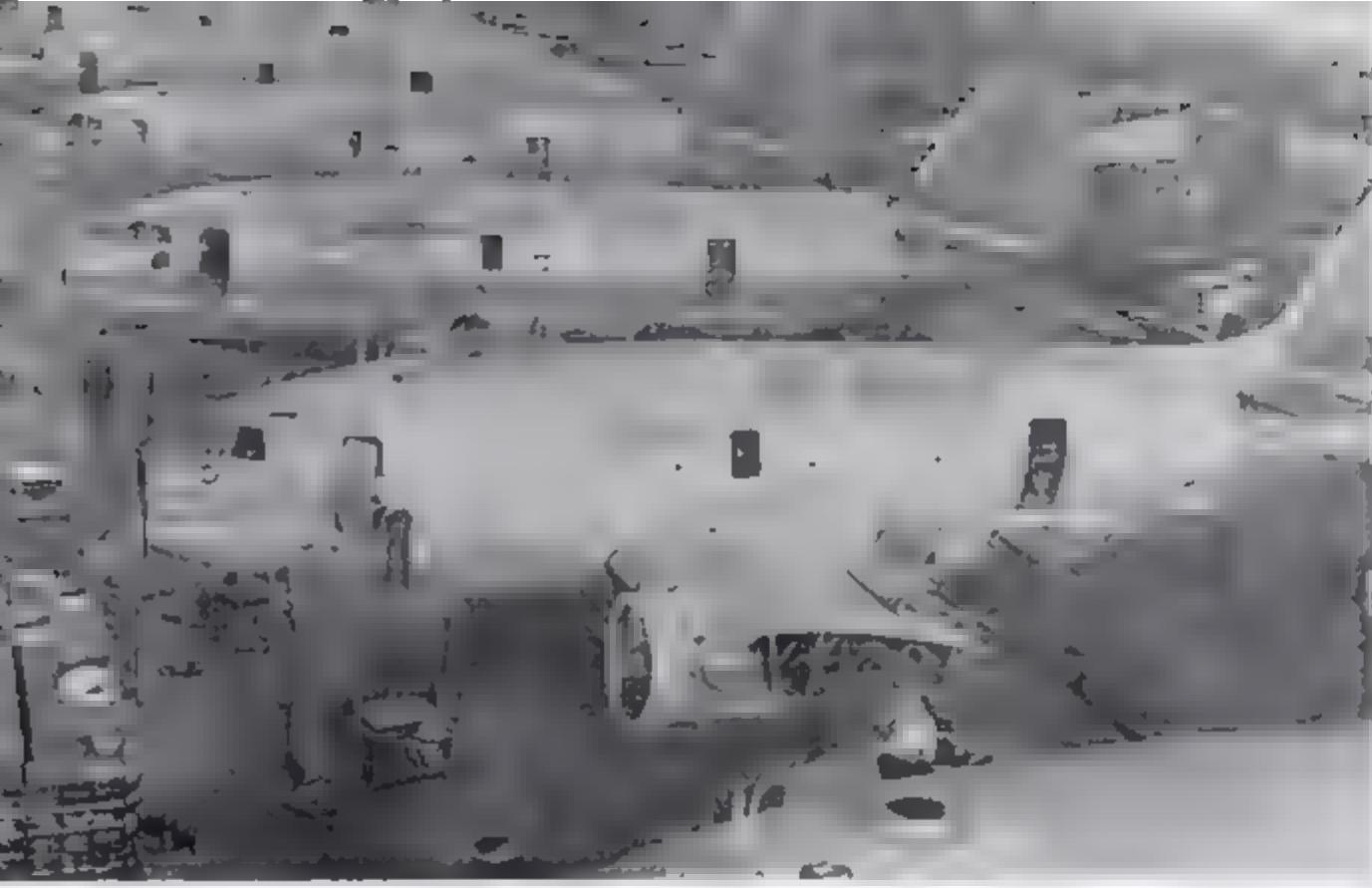


(Right) This C-46A (41-5183) – the fourth Commando built – is used in a staged photograph in 1942. Soldiers are exiting the Commando using the parallel vehicle ramps. These ramps were normally used to load and unload small vehicles. (Gerry Baizer)

(Below) Workers at a Curtiss-Wright plant work on a C-46 fuselage section during assembly. The Commando was the first aircraft to use a 'double bubble' pressurized fuselage design, which used the cabin floor as the common chord line. This feature allowed the maximum interior space while minimizing frontal area and drag. The lower cargo space under the cabin floor was an innovation in the late 1930s, but is common in current transport aircraft. (Fred Rose)

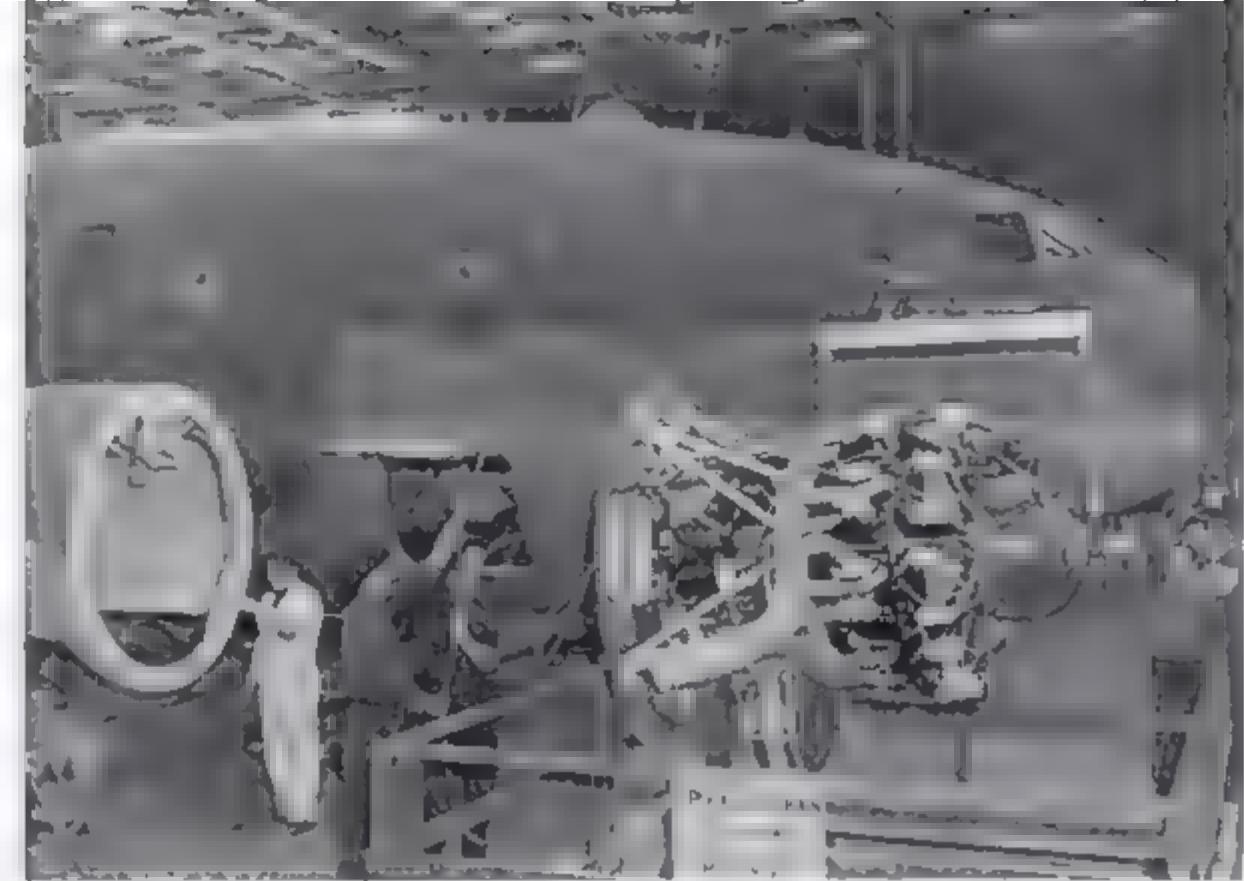
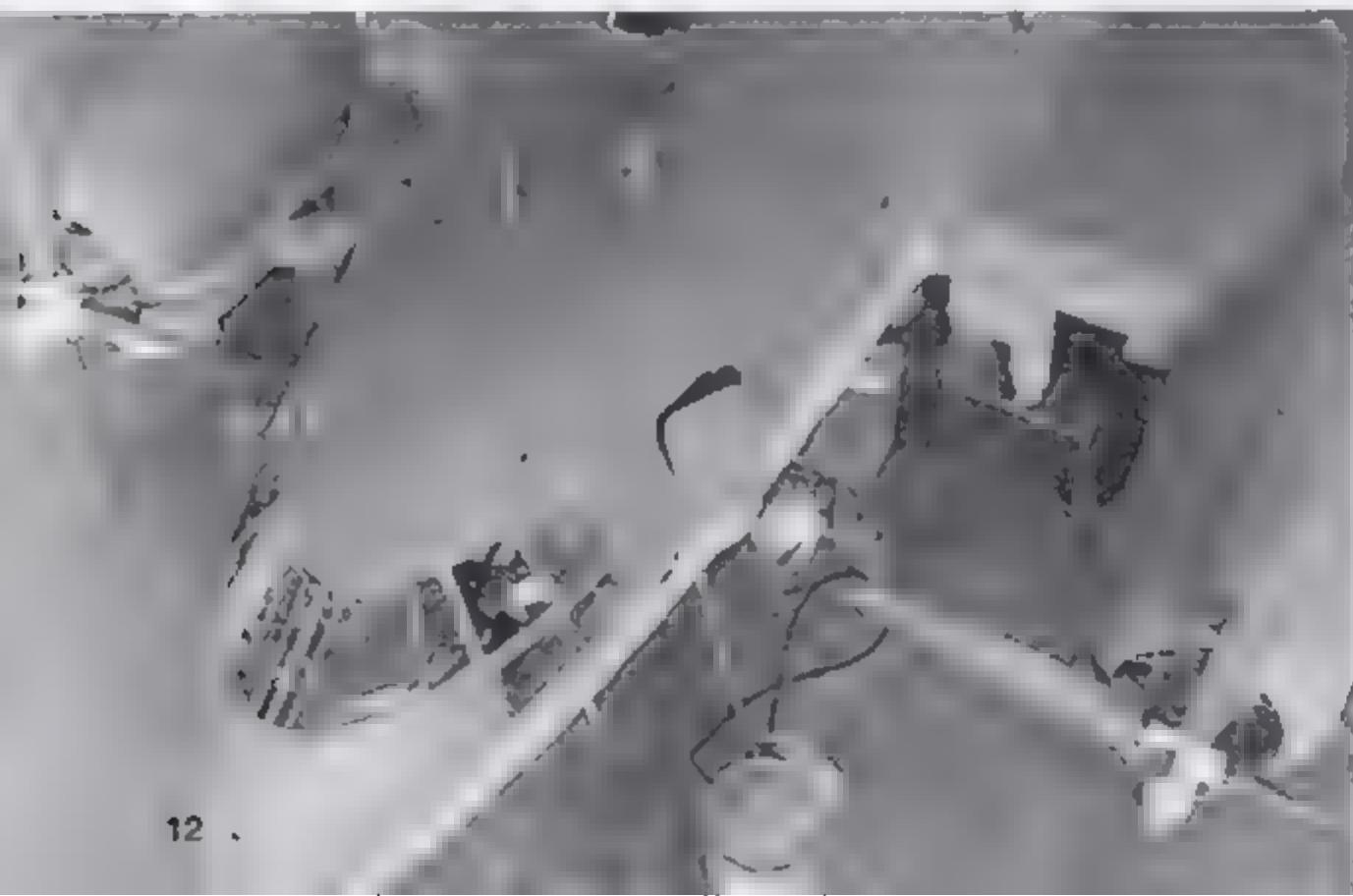
(Below Right) The cargo door is opened on the port aft fuselage of this C-46. The JSAAF greatly appreciated the Commando's spacious interior capacity of 2300 cubic feet (65.1 m^3) in the main cabin and 465 cubic feet (12.9 m^3) under the floor. The cabin floor area was 348 square feet (32.3 m^2). The C-46 interior cabin was 6 feet 8 inches (2 m) tall, 48 feet (14.6 m) long, and 9 feet 10 inches (3 m) wide. Seats accommodating up to 40 men are fitted along the fuselage sides and folded up when not in use. (Gerry Baizer)





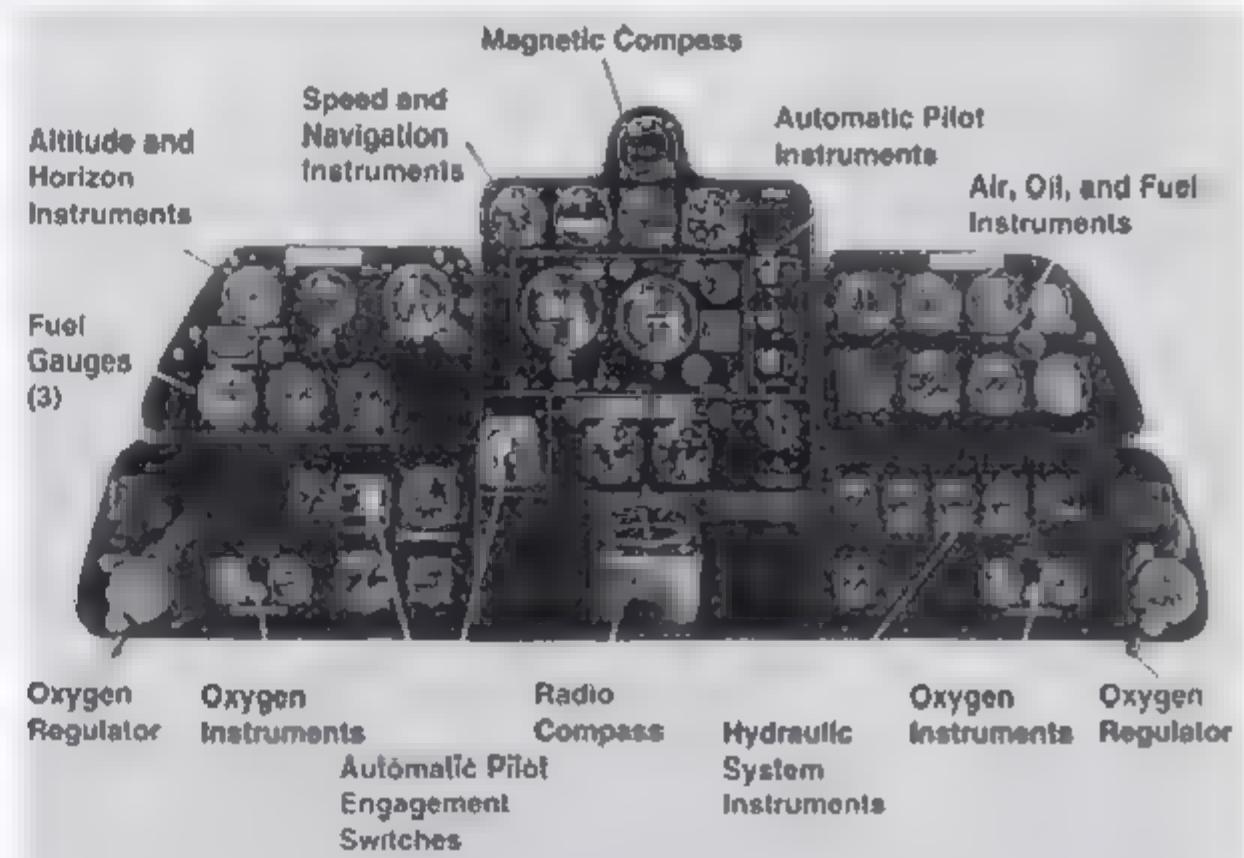
Fuselages for C-46A-25-CUs are placed alongside each other at Curtiss' Buffalo, New York factory. The near fuselage was manufacturer's number 282, which was assigned the USAAF serial number 41-24721. Commandos were built in sequential order according to the manufacturer's number. (Gerry Balzer)

The ground escape door is slightly open on this C-46 in final assembly at Curtiss' Buffalo factory. This door was not installed on the CW-20 prototype, but introduced on the C-46A. Windshield wipers are installed on the two center windows and are operated by the flight crew. The High Frequency (HF) radio antenna mast is mounted atop the fuselage, near the ADF 'football.' (Gerry Balzer)



Workers install a 2000 hp Pratt & Whitney R-2800-51-B engine onto a C-46A's starboard wing at the Buffalo plant in 1943. An exhaust collector gathered efflux from each of the engine's 18 cylinders and vented it towards the exhaust stub on the outboard side. V-shaped bearer struts secured the engine to the firewall. (Gerry Balzer)

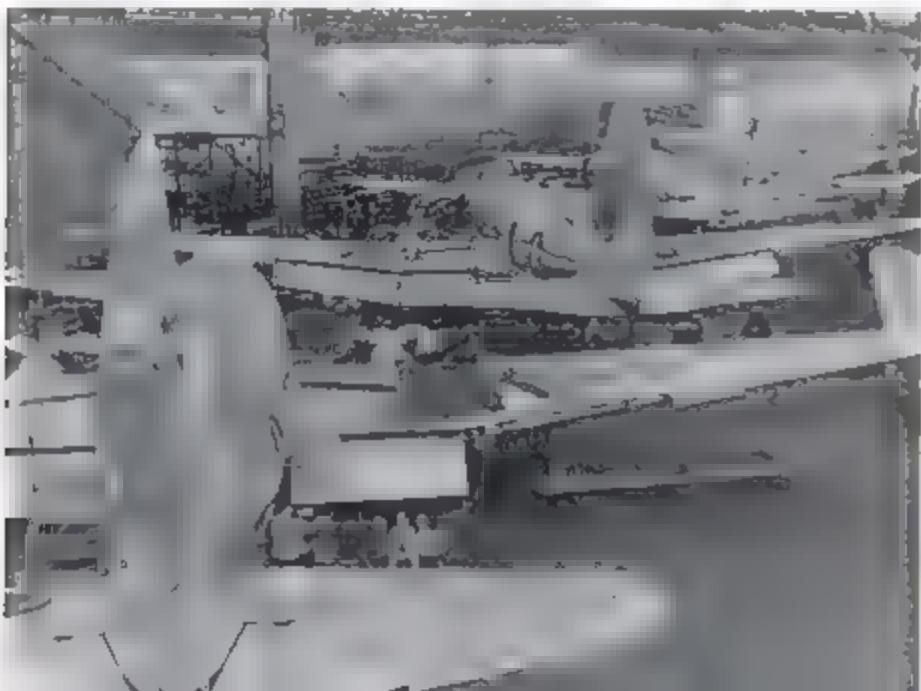
The C-46A instrument panel was little changed throughout the Commando's production run. This illustration from the flight manual had a key placed below it. USAAF aircraft instrument panels were painted semigloss Instrument Black (FS27038). The magnetic compass is located at the top center, while a radio compass is mounted at the bottom center. Oxygen regulators were located on the lower quarters of the panel. (Author)





Engine doors are opened on C-46A-30-CUs undergoing final assembly at Curtiss Buffalo plant in 1943. The port outboard flap has not been installed on the near C-46. The entire block of 50 C-46A-30-CUs was sent to the China-Burma-India (CBI) Theatre in 1943. The Buffalo factory produced Commandos at the rate of at least 100 aircraft per month. (Gerry Balzer)

Rows of C-46s undergo final assembly at Buffalo in 1944. By this date, the USAAF had discontinued the use of camouflage for transport aircraft and Commandos left the factories in natural metal. The near aircraft is a C-46A-40-CU (42-107355). (Gerry Balzer)



Workers go over C-46As on the final assembly line at the Curtiss factory in Buffalo in 1943. A rollaway stair is propped against the cargo door of the nearest Commando, which allowed someone to complete installation of this hatch. Upper cowling access panels are opened to show the R-2800 radial engines. Nose cones have not yet been installed on the far C-46s on the line. The cone provided access to the flight instruments and housed a landing light. (Gerry Balzer)



A staged photograph shows three soldiers in a Ford-built Jeep near the port engine nacelle of a C-46. The line of soldiers is waiting to board the Commando. Cowling flaps for regulating engine heat were located only on the lower nacelle for streamlining purposes. The oil cooler duct was fitted in the lower cowling lip, while the upper cowling lip housed the engine air intake duct. Each R-2800 engine turned a four-bladed Curtiss Electric propeller, which had a diameter of 13 feet 6 inches (4.1 m). (John Campbell)



This C-46 (41-6180) was one of the first 25 Commandos built. It has the three-bladed Hamilton Standard propellers used on early C-46s, before they were replaced by the four-bladed Curtiss Electric propellers. This C-46 primarily operated in the Alaskan Theatre before it was lost at sea on 23 May 1943. (Dave Hansen)

Two engine technicians perch under the opened port cowling of a C-46. The cowling was hinged at top and braced open at the rear. This allowed for easy servicing of the 2000 HP R-2800 engine. Cowlings could be fully removed for major maintenance. Propellers were flat Black with flat Orange Yellow tips. (James Crow)



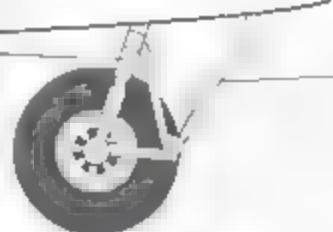


The C-46's single tail wheel was fully retracting and self centering. A locking device ensured that this wheel was aligned in the proper position for take off and landing. The tail wheel retracted up and aft, while the two gear doors closed using springs released when gear retraction was completed. (Author)

Main Landing Gear Development

CW-20/C-55

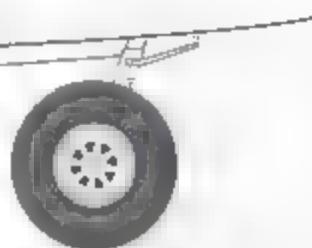
Twin Main Struts, With Inboard and Outboard Wheel Connections



Twin Aft Secondary Struts

C-46A

Single Strut, With Inboard Wheel Connection



Production Commandos employed single main landing gear struts, which were stronger than the dual struts used by the CW-20 prototype. The gear retracted hydraulically forward and up into a space between the engine and the front wing spar. A small sequenced hydraulic cylinder closed the two gear doors after the landing gear fully retracted. Strut assemblies were natural metal, while gear bays and door interiors were Zinc Chromate Green (FS34151). (Author)



An early production C-46 makes a test flight during mid-1942. A wartime censor who did not want the Axis powers to gain production information airbrushed the serial number on the tail out of the photograph. This Commando has an ADF antenna on the lower nose, but none on the upper nose. Later production C-46s had footballs on both upper and lower nose sections. (Dave Hansen)



The first production C-46 (41-5159) flies near the camera aircraft on 21 June 1942. An unidentified antenna is mounted under the nose, with the ADF 'football' between the two pitot tubes. The latter items collected air speed information for the instruments. The area immediately aft of the exhaust stub was left in natural metal; this section was often over-painted on production C-46s. (Author)

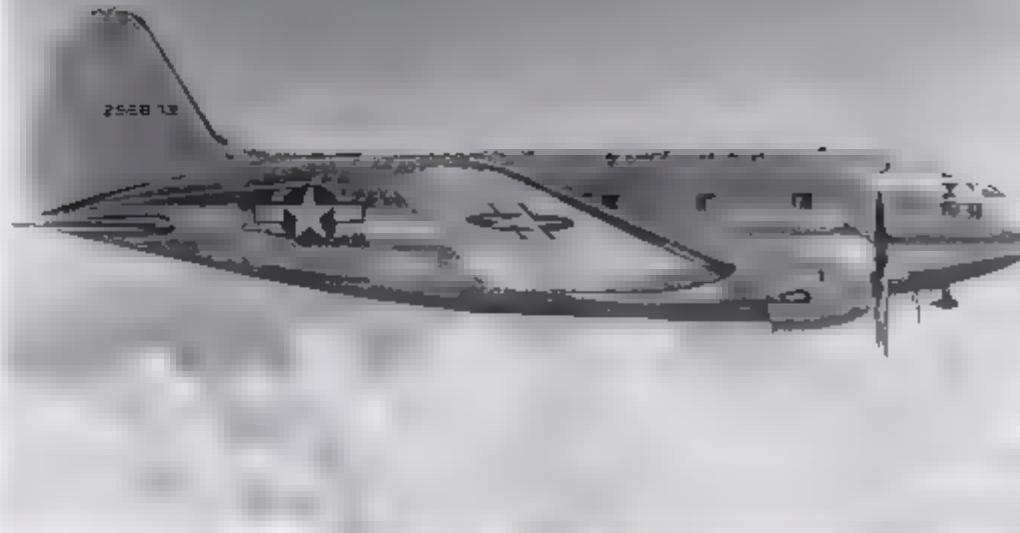


This C-46A-10-CU (41-12368) makes a delivery flight to the CBI in May of 1943. Upon arrival in the theatre, the Commando flew supply missions over the 'Hump' (the Himalayan Mountains) from India to China. Black rubber deicer boots were standard equipment on the leading edges of the C-46's wing and tail surfaces. Flexible tubes within these boots were alternately filled with liquid to crack ice as it formed on the surface. The clear dome fitted into the upper fuselage allowed the navigator to observe waypoints in the sky. This Commando survived World War Two, but was scrapped soon after the conflict ended. This fate occurred to many early C-46s in the CBI, due to their heavy usage and minimal maintenance. (Gerry Balzer)



A C-46A-20-CU (41-24680) is parked on a grassy airfield in an unknown location. The Commando proved rugged enough to operate on airfields in even worse conditions than the one pictured here. The mid-fuselage demarcation between the Olive Drab upper surfaces and Neutral Gray undersurfaces was often a wavy line. (Dave Hansen)

A C-46A-35-CU (42-3852) is parked on an airfield during the latter half of World War Two. The aircraft was later loaded with the Allison V-1710 inline engines lined up in the background. This fairly clean C-46 is believed to be a newly built Commando. The serial number on the tail was Flat Black (FS37038). (Dave Hansen)



A bare metal C-46A-50-CU (42-96903) flies a test flight from Buffalo prior to delivery to the USAAF. It mainly operated in Alaska and went on to cargo service in South America during the 1960s. A Y-shaped antenna replaced the upper nose ADF footbox. Short masts on the upper fuselage were HF radio antennas. (Dave Hansen)

This C-46A-40-CU (42-80943) rests at a state-side airfield awaiting its next mission. Most Commandos were equipped with four-bladed 13 feet 8 inches (4.1 m) diameter Curtiss Electric propellers. This C-46 crashed flying over the Andes Mountains in Chile in 1959. Investigators found the aircraft was overweight at the time of the accident. (Dave Hansen)





A pilot leans out the cockpit window of this early Louisville-built C-46A-1-CK (43-46963). Two other crewmen stand near the main landing gear. The Commando is painted in the Olive Drab over Neutral Gray camouflage. It was delivered to an Air Transport Command

(ATC) unit in North Africa in 1944. Curtiss used the government-owned plant in Louisville to build 439 C-46As and to repair faults in Commandos built at Buffalo and rushed into service. (Fred Roos)

This Buffalo-built C-46A-50-CU (42-101152) was delivered to the CBI in 1944. The rudder lock fitted to the base of the rudder prevented this surface from freely swaying in the wind while the aircraft was on the ground. A boarding ladder hangs up against the aft fuselage

near the cargo door. On 9 February 1945, this Commando crashed in the Himalayas and became part of the "Aluminum Trail" of crashed aircraft flying the Hump into Kunming, China. (Gerry Balzer)



R5C-1 Commando

The US Navy ordered 160 C-46A Commandos for the US Marine Corps (USMC) under the Navy/Marine designation R5C-1. All were delivered to the USMC for Marine amphibious operations support in the Pacific Theatre. The Marines received their first Commando on 25 February 1943, but subsequent deliveries were slow due to US Army Air Forces (USAAF) commitments. Only 30 R5C-1s were delivered to the Marines by the end of 1943; however, all 60 aircraft on the order were delivered by the end of World War Two in 1945.

This order consisted of 92 C-46A-CUs (Buffalo built) and 68 C-46A-CKs (Louisville built). The first 120 R5C-1s were ordered in June of 1942 and were assigned the Navy Bureau of Aeronautics Numbers (BuNos) 39492 through 39611. The remaining 40 aircraft (BuNos 40691 through 40729) were ordered in late 1943. The additional R5C-1s on order were canceled on V-J Day (2 September 1945); they were not assigned BuNos.

The R5C-1 equipped at least six Marine Transport Squadrons in the Pacific theatre: VMR 252, VMR 253, VMR 352, VMR 353, VMR 952, and VMR 953. The Marine Commandos were originally delivered in the USAAF camouflage of Olive Drab over Neutral Gray, but these aircraft were later stripped to bare metal finishes. Towards the Pacific War's conclusion in 1945, a few R5C-1s were repainted overall Glossy Sea Blue (FS15042) at Navy repair depots.

The Marines employed the Commando in their Pacific island-hopping campaign. R5C-1s flew supplies and wounded Marines and sailors out of numerous island landing strips. At least one R5C-1 (BuNo 37576) was converted into an R5C-1Z VIP transport in 1946. The Marines operated the Commando for several years and the Navy also took some from the Marines for several support squadrons. The US Coast Guard (USCG) received ten Commandos from the Marines. They were used for logistic and personnel transport to Coast Guard facilities in the United States and overseas. The last USCG R5C-1 was retired in 1950. The Navy and Marines operated the Commando into the mid-1950s. After World War Two, I.B. Smith Aircraft Corporation in Miami, Florida purchased several surplus Marine Commandos and converted them for civilian freighter use.

A Marine Corps R5C-1 takes off on another mission in the Pacific Theatre. The landing gear is completing its retraction cycle and the flaps are moving up and forward from their take off setting. The Commando was an aerodynamically clean aircraft. (Gerry Balzer)



An R5C-1 Commando (White 21) taxis past a Vought F4U Corsair fighter at Peleliu, Palau Islands on 17 October 1944. The transport was assigned to a unit of the 2nd Marine Air Wing (MAW). Marine R5C-1s originally retained their USAAF camouflage with white numbers on the nose and tail. (Fred Roots)

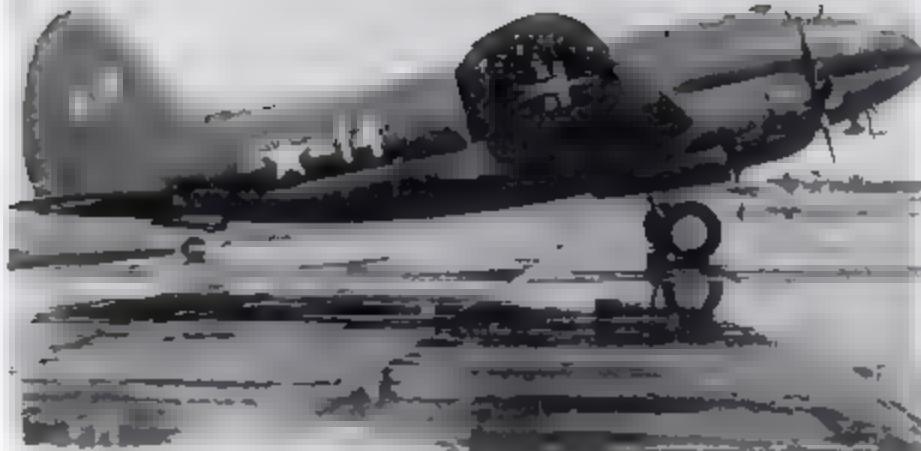
Natural metal R5C-1s of Marine Air Group 45 (MAG-45) are parked at Oahu Atoll, Caroline Islands on 3 April 1945. The Commandos supported US Marine Corps amphibious operations in the Pacific. Natural metal finish replaced camouflage on R5Cs late in the Pacific War. The robust Commando easily adapted to the climate in this theatre of operations. (Fred Roots)





This R5C-1 (LH-14) was assigned to Marine Transport Squadron 252 (VMR-252) at Marine Corps Air Station (MCAS) Cherry Point, North Carolina in 1947. It was painted overall Glossy Sea Blue (FS15042) with white markings. This Commando visited the 1947 National Air Races in Cleveland, Ohio. (Warren Bodie via Fred Roos)

A US Navy R5C-1 makes its take off run from a muddy airfield in Korea during the early 1950s. Another Commando is parked alongside the airstrip. The Navy's Commandos flew supply missions in support of US Marine Corps operations during the Korean War (Author)



The same VMR-252 R5C-1 (LH-14) is parked on the ramp in Cleveland at the 1947 National Air Races. The double bubble fuselage makes the lower fuselage appear a lighter shade of color. The white and red portions of the US national insignia were painted directly onto the Sea Blue finish. Instead of the usual Insignia Blue circle and outer trim. (Naval Aviation Library via Rick Wargo)

This natural metal R5C-1 (AC-573) was assigned to VMA-153 2nd MAW at MCAS Cherry Point in April of 1950. Many Commandos had bare metal surfaces in their post-World War Two Navy and Marine service. This aircraft's markings are Glossy Black (FS17038), while the deicer boots and wing walkways are Flat Black. (USMC via Robert Lawson)



XC-46B and XC-46C Commando

In late 1943, the first St. Louis-built C-46A (43-46953) was converted on the assembly line into the XC-46B (CW-20B-1). Its 2000 hp Pratt & Whitney R-2800-34W 18-cylinder air-cooled radial engines were replaced by 2000 hp Pratt & Whitney R-2800-34W 18-cylinder air-cooled radial engines. This powerplant employed water injection for maximum takeoff power. A stepped airliner-type windshield replaces the C-46A's faired windshield. Other XC-46B specifications remained the same as for the earlier C-46A. The only XC-46B was delivered to the USAAF in January of 1944, however, no follow-on orders were placed for this variant.

The XC-46C designation was apparently given to one – possibly two – C-46A conversions at St. Louis. Little is known of the conversion details, although it is believed that the XC-46C had the squared wing tips used by the later C-46D.

C-46D Commando

The C-46D (CW-20B-2) was the other major Commando production variant. This was actually a C-46A slightly modified on Curtiss' Buffalo, New York production line for troop-carrying duties. A smaller paratroop jumping door was added to the large cargo door which was mounted on the port fuselage side. A similar paratroop door was added to the starboard fuselage side, which allowed paratroopers to simultaneously exit both sides of the aircraft. Fifty paratroopers – ten more than the C-46A's 40-man capacity – could be accommodated in this configuration. They sat in folding seats arranged along the main cabin's sides.

The C-46D external dimensions were the same as for the earlier C-46A. Its wingspan was 108 feet 1 inch (32.9 m), with a length of 76 feet 4 inches (23.3 m) and a height of 21 feet 9 inches (6.6 m). The aircraft weighed 30,000 pounds (13,608 kg) empty and 45,000 pounds (20,412 kg) fully loaded.

A pair of 2000 hp Pratt & Whitney R-2800-51 Double Wasp 18-cylinder, air cooled, radial engines powered the C-46D. These engines turned four-bladed Curtiss Electric variable pitch propellers. The Commando had a maximum speed of 270 mph (434.5 km/h) at 15,000 feet (4572 m). Its service ceiling was 26,900 feet (8,091 m) and its maximum range was 3150 miles (5069.3 km). The standard crew remained at three: pilot, co-pilot, and radio operator; however, a navigator was sometimes added for long-distance flights. Each C-46D cost the USAAF approximately \$250,000.

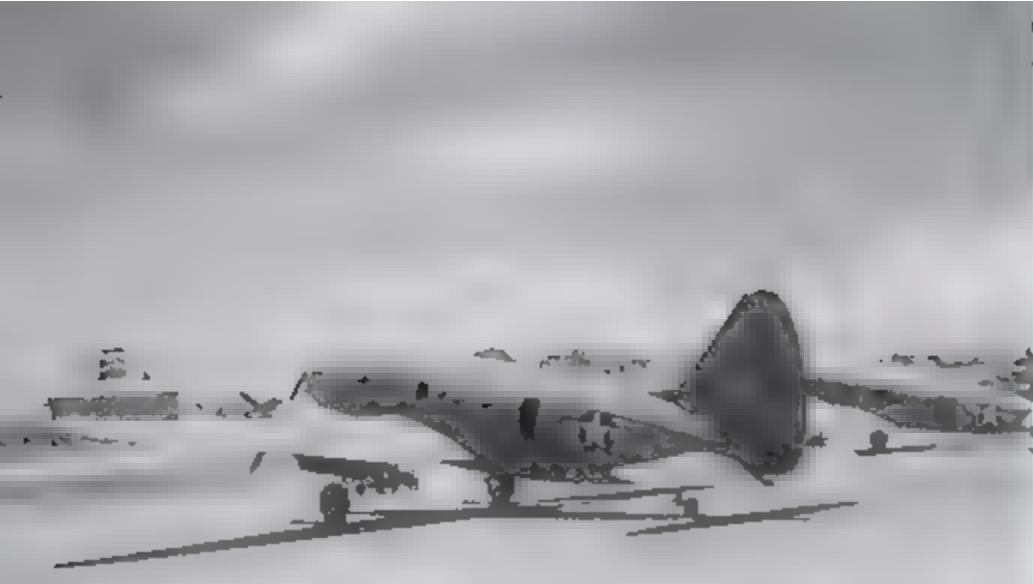
Curtiss built 1410 C-46Ds – 82 fewer aircraft than the 1492 C-46As completed – at its Buffalo factory from September of 1944 until July of 1945. Commando production then switched to the C-46F before World War Two ended on 2 September 1945.

A C-46D-15-CU (44-77998) flies over the Philippines in mid-1945. The USAAF accepted the Commando on 7 March 1945 and sent it to Manila, the Philippines that spring. The aircraft remained in the Philippines until it was scrapped in 1947. The Olive Drab and Neutral Gray demarcation appears to meet where the upper and lower fuselage halves come together. Curtiss' Buffalo factory built all 1410 C-46Ds. (Rick Wargo)

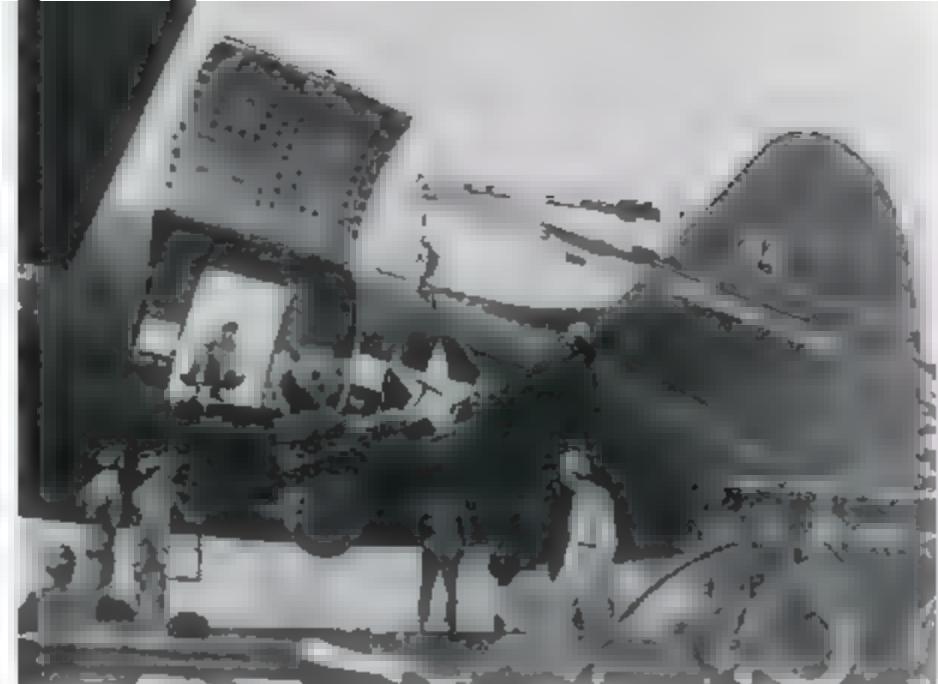


Curtiss-Wright converted the first St. Louis-built C-46A (43-46953) into the sole XC-46B. This aircraft featured a stepped airliner-type windshield replacing the Commando's faired windshield. The XC-46B was powered by two 2100 hp Wright R-2800-34W radial engines. An X (believed to be red) is painted above the serial number on the tail. Curtiss delivered this Commando to the USAAF in January of 1944. (Dave Hansen)





TOKYO TROLLEY is painted in yellow above the fuselage windows of this C-46D-10-CU (44-77484) at Nichols Field, near Manila on 10 June 1945. One of the mid-fuselage emergency exit doors is open as is the auxiliary passenger door on the aft fuselage. Loss of hydraulic pressure resulted in the lowered wing flaps while the C-46 was parked. This Commando partially obscures a Douglas C-47 Skytrain parked alongside it. (James Crow)



Soldiers use a crane to hoist a Jeep onto a C-46D-20-CU (44-78354) at a Pacific airfield in 1944. The Commando could carry up to three of the 3253 pound (1475.6 kg) 4x4 light trucks. The main cargo door was 8 feet (2.4 m) wide and 8 feet 8.5 inches (2.6 m) high. The starboard passenger door opposite of the cargo door is open on this C-46. The number 44 above the serial number on the tail is either white or a light gray. (James Crow)



This C-46D-10-CU (44-77637) was one of three Commandos assigned to the 135th Troop Carrier Squadron, Maryland Air National Guard (ANG) in 1955. This unit was based at Harbor Field in Baltimore. C-46Ds differed from similar C-46As in having a passenger door on the starboard aft fuselage side. This door combined with a similar door on the port cargo door to allow paratroopers to exit from both sides of the aircraft during airborne operations. The C-46D had seating for 60 fully-equipped paratroopers, up from 40 on the earlier C-46A. From 1955 until 1964, USAF and ANG aircraft over ten years old had a 0 (Zero) prefix added to the tail number. This prefix indicated an obsolete aircraft. In 1959, this Commando was withdrawn from Maryland ANG service and stored until sent to the Government of India (registered VT-DVP) in 1967. (Rick Wargo)

C-46E and C-46F Commando

The beautiful, smooth lines of the C-46's nose were changed to an 'airliner' type of nose on the C-46E. CW 20E. Only 17 broken-nose Commandos were built although a contract for 480 C-46Es was placed (43-47403 through 43-47952). This order was canceled due to the wholesale cutbacks following the end of World War Two in 1945. All C-46Es were delivered during late July and early August of 1945. The 17 C-46Es were in Oakland, California awaiting delivery to the war zone in the Pacific, but were ferried to storage centers in California and Arkansas following the conflict's end. The transports were then turned over to the Reconstruction Finance Corporation (RFC) or the War Assets Administration (WAA) for disposal along with almost 1000 other Commandos worldwide. They were new, and eligible for certification or commercial freight or passenger service by the Civil Aviation Administration (CAA) (now known as the Federal Aviation Administration, or FAA). Earl F. Slick of San Antonio, Texas bought all 17 C-46Es for \$747,000. Each aircraft cost approximately \$75,000 when new! He founded Slick Airways in January of 1946 with backing from Texas oil interests who wanted fast service for shipping of pipelines and other related cargo. Slick Airways became the leading freight carrier in the United States by the late 1940s. The C-46's higher speed and lower per tonne costs compared to the Douglas C-47 Skytrains DC-3s used by other freight haulers at the time gave Slick an immediate advantage. Slick Airways moved from San Antonio to Burbank, California in April of 1949.

The C-46B's primary distinguishing feature was the stepped nose, with a V-shaped flat pane windshield in rear to the C-47. The windshield design and the accompanying deeper side windows were intended to provide greater visibility. One C-46E (43-46953) with the new windshield configuration was converted as a test vehicle or aerodynamic prototype and was designated the XC-46B. The production version was to be called a C-46E. It also had two non-standard Pratt & Whitney R-2800-14W engines with three-bladed Hamilton Standard

C-46A/D

Faired Windshield



Rounded Wingtips

C-46E

Stepped Windshield



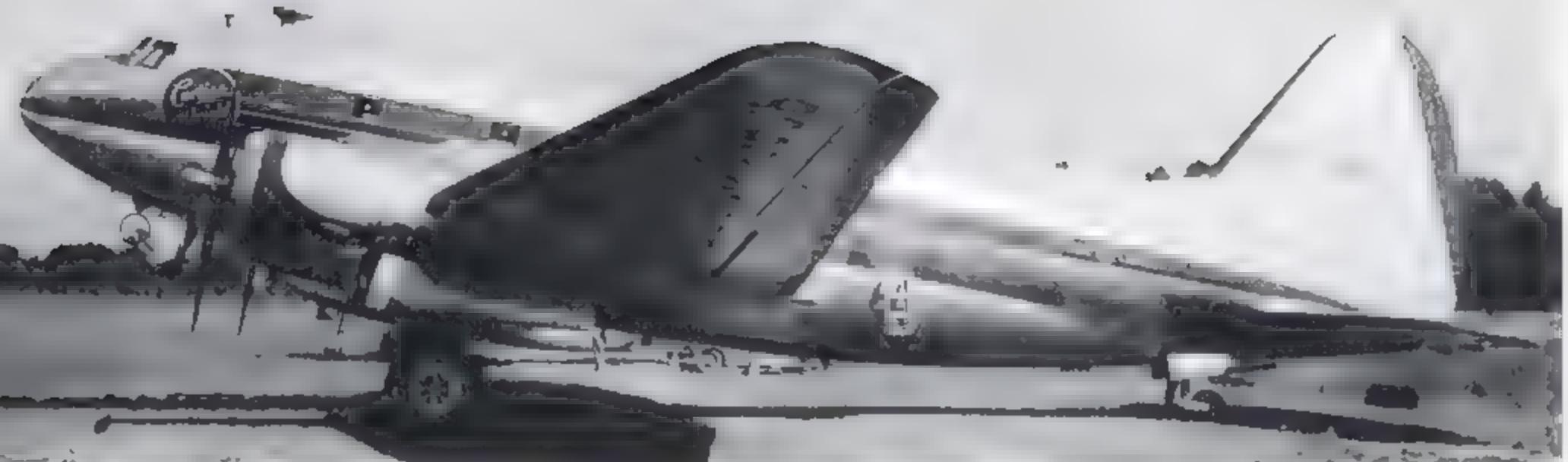
Squared Wingtips



The first 'broken nose' production Commando was this C-46E-1-CS (43-47403), which is parked outside Curtiss' St. Louis plant after completion in July of 1945. Curtiss built only 17 C-46Es. The other 483 aircraft on contract were canceled after V-J Day (2 September 1945). After the war, Curtiss used this Commando for civil type approval trials. (Gerry Balzer)

The second C-46 built was this C-46E-1-CS (43-47404), which is parked outside Curtiss' St. Louis plant in 1945. This variant featured the stepped windshield first used on the XC-46B. After World War Two, this Commando was used for trials at Wright Field, Ohio until declared surplus in 1957. The aircraft later operated in Mexico before it was withdrawn from use in 1969. (Dave Hansen)





In 1946, Curtiss-Wright acquired the first C-46E (43-47403) and registered it as NX39636. The firm based the aircraft at St. Louis and used it for Civil Aviation Administration (CAA now the Federal Aviation Administration, FAA) certificate testing. NX39636 is parked on

the display ramp at the 1946 National Air Races in Cleveland. C-46Es and Fs featured squared wingtips in place of the rounded wingtips of earlier Commandos. (Dick Phillips)

propellers instead of the four-bladed Curtiss Electric type common on most other Commandos. Additionally, the C-46F deleted the control boost system – which had proved to be a maintenance headache and not really necessary – and also had only a single cargo door. The C-46F was to be built at St. Louis and Louisville and was intended primarily for lend-lease to the Chinese. The C-46F prototype was redesignated ZC-46F in 1948 before being sold to Slick. (The Z designation prefix indicated an obsolete aircraft in US service. The US Army and US Air Force used this prefix between 1928 and 1962.)

The C-46E (CW-20E) airliner was designed with 2500 hp Wright R-3350 Cyclone 18 engines in place of the 2000 hp R-2800s. Eastern Airlines ordered the CW-20E in 1945 but cancelled this order when cheap war surplus C-47s and Douglas C-54 Skymasters (DC-4s) became available the next year. The first C-46E (43-47403) was accepted on 30 June 1945 and later transferred to the CAA, and then back to Curtiss-Wright. It was used for CAA Type Approval Certification tests and later as a corporate executive aircraft.

The C-46F variant was similar to the C-46E but retained the original windshield profile and cargo doors. This new variant also had new squared wing tips in place of the rounded wing tips of other Commandos, however the wingspan remained at 108 feet 1 inch (32.9 m). C-46Fs were also equipped with 2000 hp Pratt & Whitney R-2800-75 engines, which replaced the 2000 hp Pratt & Whitney R-2800-51s that powered the C-46D-10-CU and later Commandos. The C-46F also replaced the four-bladed Curtiss Electric propellers with three-bladed Hamilton Standard propellers. Ailerons and elevator power boosting were also deleted from the F model. Curtiss built 234 C-46Fs at Buffalo before production ended in September of 1949.

Wingtip Development

C-46A/D

Rounded Wingtip

C-46E/F

Squared Wingtip

British Overseas Airways Corporation (BOAC) acquired the CW-20 prototype (C-55) from the USAAF in November of 1941. It was named ST LOUIS and registered G-AGDI for passenger and cargo service. Flame dampers are mounted over the engine exhausts for night flights.



Curtiss delivered the first production C-46A (41-5159) to the USAAF on 13 July 1942. This aircraft survived World War Two.



This C-46A (42-107342) was assigned to a unit of the Air Transport Command (ATC), USAAF at Chabua, India in 1944. The Commando was employed on supply flights over 'The Hump' to China.



The Egyptian Air Force acquired this C-46A (1015) from USAAF surplus in Cairo after World War Two ended. This Commando flew in Egyptian service during the late 1940s and early 1950s.



Painted overall Glossy Sea Blue, this R5C-1 (LWH-14) was assigned to Marine Transport Squadron 252 (VMR-252). This unit was based at MCAS Cherry Point, North Carolina in the late 1940s. The Navy ordered C-46As (R5C-1s) on behalf of the Marines during World War Two.



SMILEY'S AIRLINES was the name bestowed upon this C-46D (42-101211) assigned to the 4th Combat Cargo Group. This Commando flew supplies to Andaw, Burma on 11 March 1945.



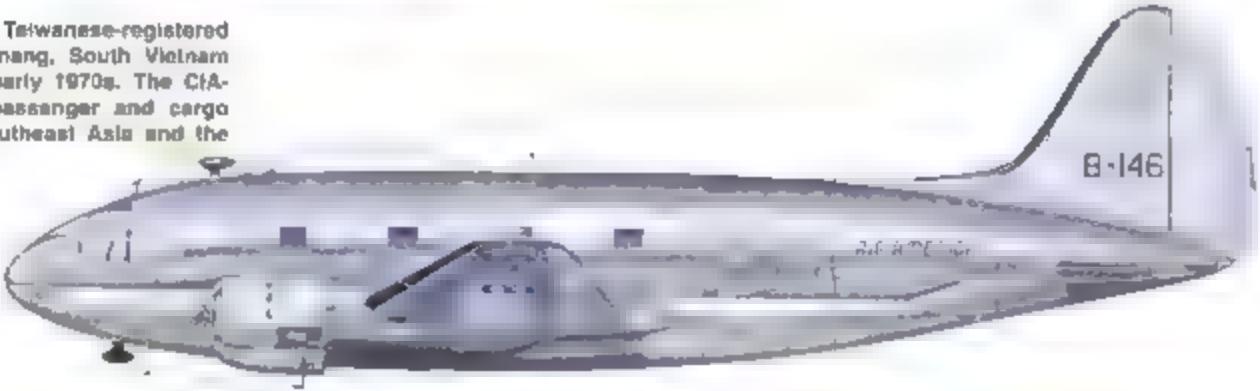
This C-46C (44-78019) was assigned to a USAF unit in Alaska during the early 1950s. The red tail and wingtips aided visibility if the Commando went down in snowy terrain.



The 130th Troop Carrier Squadron (Medium), West Virginia Air National Guard was assigned this C-46D (44-77819) during the late 1950s. This Squadron was based at Kanawha County Airport.



Air America flew this Taiwanese-registered C-46D (B-146) from Danang, South Vietnam during the 1960s and early 1970s. The CIA-operated airline flew passenger and cargo services throughout Southeast Asia and the Western Pacific.



The Japan Air Self-Defense Force (JASDF) converted three C-46s into EC-46D ECM trainers, including 91-1145 (formerly C-46A 43-47328). This Commando was flown in this role between 1973 and 1978.



C-46G/XC-113

The C-46G (CW-20B-5) was similar to the earlier C-46D; however, it was modified with double cargo doors and powered by two 2,100 HP Pratt & Whitney R-2800-14W engines. This variant also had the new square wingtips and the stepped windshield of the XC-46B and the C-46E. When the war ended, only one C-46G (44-78945) was built at Buffalo. It was the first of 300 C-46G-1-CUs ordered and they were intended to follow the 400 C-46F-1-CUs also on order.

Following its delivery to the USAAF on 26 February 1946, the sole C-46G was flown to Columbus, Ohio on 31 April 1946. The aircraft was converted at Curtiss-Wright's Columbus factory to the XC-113. This conversion was to test the new 2,700 shaft horsepower (6200 rpm) General Electric TG-100 (later T-31-GE-3) turboprop engine in the nose. This powerplant was the first U.S. turboprop engine and was intended for the Convair XP-81 jet-powered fighter. Only two XP-81s were built and their disappointing performance led to their cancellation in 1947. (The TG-100 could not be installed in the nose because the cockpit was too far forward; consequently, the single test engine was mounted in the starboard nacelle.) The port R-2800 radial piston engine was retained, but the power output and throttle response between the two powerplants differed enough to make the XC-113 virtually uncontrollable. Test pilots refused to fly after a ground accident so this aircraft never flew. By the summer of 1948, the C-46G/XC-113's starboard engine was replaced by a standard R-2800. The transport was declared surplus and sold to a civilian operator; its subsequent fate is unknown.

Other C-46 Models

The C-46H was to be a more powerful version of the C-46F, but with twin tail wheels. The USAAF ordered 300 C-46Hs, but canceled this order when World War Two ended. One C-46A (42-107294) was modified to C-46H standard in 1946. The C-46J (there was no C-46I) was planned as an updated C-46E, but none were built or converted. The XC-46K (CW-20F-2) was a projected C-46P conversion to be powered by a pair of 2500 HP Wright R-3350-BD radial engines. It was canceled at the end of the war. The XC-46L (CW-20H) was the designation reportedly given to three C-46As modified with 2500 HP Wright R-3350-BD engines in 1945. These new engines raised the C-46's top speed to 284 MPH (457 km/h). The three XC-46Ls were used as flying test beds shortly after World War Two.

The TG-100 turboprop engine was originally to be installed in the XC-113's nose; however, its large size resulted in its mounting in the starboard nacelle. This powerplant was intended for the Convair XP-81 escort fighter. The differing throttle response and power output of the turboprop and piston engines made the XC-113 extremely difficult to operate. Test pilots refused to fly it and the aircraft never flew in this configuration. (Louis Elscher)



The sole C-46G (44-78945) was delivered to the USAAF at Buffalo on 26 February 1946. The following spring, it was converted into the only XC-113 at Columbus, Ohio. This variant had a Pratt & Whitney R-2800 piston engine in the port nacelle and a General Electric TG-100 (later T-31-GE-3) turboprop engine to starboard. The Commando was painted Olive Drab (FS34087) over Neutral Gray (FS38173). (Louie Elscher)



The 'Hump'

C-46s were found operating in every theatre of World War Two, but it was in Asia that the Commando served in the greatest numbers and to the best effect. More than any other aircraft the C-46 was used to establish and maintain the aerial lifeline between India and China over the Himalayan Mountains – the Hump. The C-46's finest hour during World War Two was flying the Hump, which runs from north to south at the eastern end of the Himalayas. The peaks are over 22,000 feet (6,705.6 m) well above the cruising ceiling of most transports of the day – except for the C-46. The Commando had much better performance than the C-47 Skytrain at the altitudes involved in carrying supplies to China. Flying the 'Hump' also demanded navigational skills, determination, bravery, and luck in volume. The C-46 was quickly adopted in the China-Burma-India (CBI) Theatre of Operations where its large pay load capacity and high altitude performance made a vital contribution to the airlift's success.

Safe passage over and around the peaks of northern Burma required an altitude of at least 20,000 to 22,000 feet (6,096 to 6,705.6 m) eastbound and 21,000 feet (6,400.8 m) westbound. The loss of an engine would have only one outcome. The wing level was approximately 20,000 feet (6,096 m) and then the weather became atrocious. Most flying was done on instruments with constant cloud cover, frequent wild thunderstorms, and tricky wind currents over the mountains. Incredible amounts of rain and muggy, humid weather accompanied the monsoon season from May until late October in India and Burma. Good weather with clear blue skies long awaited dry season in India from November to March but when the weather was good in India it was usually ten times in China. To say that this was dangerous flying would be an understatement. Without a doubt, poor weather was the greatest hindrance to flying the Hump – and it was there all of the time. Additionally the 500 mile (804.6 km) route to Kunming, China lacked radio aids and adequate charts, and Japanese fighters covered it.

The Japanese fighters came up when the weather was good. Clear weather was zero weather.

In Hump language it was the kind of day the Japanese liked to prove their skill in flying for over-loaded C-46s flown by over-worked, low-time flight crews. Japan's fighter aircraft included the Mitsubishi A6M Zero naval fighter (Allied codename Zeke); however most Japanese fighters in this region were Army aircraft, including Nakajima's Ki-43 (Oscar), Ki-44 (Tojo), and Ki-84 (Frank). On 13 October 1943, Japanese fighters shot down one C-46, a Consolidated C-82 cargo-audited twin-engine B-24 Liberator and two C-47s. More C-46s were shot down on 21 October and 22 October. These losses resulted in a slight route shift and Allied attacks were carried out on various Japanese airfields.

The Burma Road connected both India and Burma to China. It was used to keep supplies flowing into China in April of 1942 after Japanese capture Lashio, Burma and gained control of the Burma Road. At this point the only way to get supplies to China was via an air lift over the peaks of the Himalayas. Because the Japanese controlled the entire Chinese coast and the Burma Road was closed, all supplies – especially aviation fuel – had to be airlifted in.

Airlift operations, using C-47s, began on 8 May 1942. The C-47 proved unsuitable for the task and C-46s and C-82s were needed. When the air lift was first planned in support of Brigadier General Claire Lee Chennault's and Lieutenant General Joseph W. S. Tamm's ground operations, the planners set a target of 750 tons (760 t) of supplies per month. This proved to be optimistic; that tonnage was not achieved until October of 1943. In fact, only 1,227 tons (1,113.1 t) were brought in during December of 1942. This was just a fraction of China's needs. Air Transport Command (ATC) of USAAF took over the operations on 1 December 1942.

A typical load comprised of twenty-three 55-gallon (208.2 L) steel drums of 100 octane aviation gasoline and 400 pounds (180.8 kg) of antifreeze. All cargo was smooth flight to

¹The C-47 was a de-motorized cargo version of the four-engine B-24 Liberator heavy bomber.

²Chennault commanded the American Volunteer Group (Flying Tigers) in 1941–42, then was Commander-in-Chief of the US 14th Air Force in China.

³Sullivan was Chief of Staff to China's leader Generalissimo Chiang Kai-shek.



Four new production C-46A Commandos await delivery to the USAAF in late 1942 or early 1943. These aircraft are fitted with the three-bladed Hamilton Standard propellers common on early C-46s. A censor crudely marked out the near aircraft's serial number using a pen. This was believed to prevent enemy agents from gauging the numerical strength of the USAAF. The national insignia – a white star within a blue circle – was painted on the upper port and lower starboard wing surfaces and the aft fuselage. (Gerry Balzar)

Kunming, it was possible to remove up to 300 gallons (1135.6 L) of fuel from a C-46's tanks in China; however, it was usual for some of the fuel carried as cargo to be added to that remaining in the C-46's tanks. Other cargo carried included earth moving equipment, aircraft engines, spare parts, and other military supplies. A big plus for the Commando was its ability to haul a 105mm howitzer without disassembly. Occasionally, C-46s were diverted to emergency personnel transport duties in support of ground operations. Little cargo was carried out of China, but Chinese troops were flown back to India for training for the re-conquest of Burma. Most Chinese peasant soldiers were frightened of flying having never seen an airplane, let alone flown in one. After some armed Chinese troops caused a few crashes, no Chinese troops could carry arms. American crews were also armed to protect the Chinese troops. The Hump pilots soon discovered they could buy anything on the black market in Kunming that they had just risked their lives to fly in. They also found that it was necessary to have armed flight crews in and around the aircraft while Chinese peasants were unloading the cargo. This made sure that no one would steal supplies from a Commando or leave a bomb onboard. The Japanese had placed a bounty on the destruction of a C-46.

The problems associated with flying the Hump received one of the highest priorities by the US military. General H. H. Harmon, Chief of the USAAC visited the operations in early 1943. In February of 1943 Madame Chiang Kai Shek addressed the US Congress and pleaded for more supplies. President Franklin D. Roosevelt agreed and ordered 700 tons (650.3 MT) to be delivered in July of 1943, and 10,000 tons (91.72 MT) per month by September of 1943. Both Stilwell and Chennault were called to Washington for re-planning the Hump operations. The planning resulted in the initiation of Project 7, a mass deployment of ATC per-

This Buffalo-built C-46A-40-CU (42-61056) lost its port main landing gear while landing at Kunming, China in 1944. The rest of the airframe sustained little apparent damage, which testified to the Commando's structural durability. Both the nose trim and the front of the tailband are believed to be either white or yellow with black numbering. Fresh Olive Drab was painted over the aft tailband section and fuselage ATC insignia. (John Campbell)

sonne from Florida to India. By July of 1943 almost 2000 men and nearly 20 tons (38.4 MT) of supplies were ferried to India. Additional personnel were sent by sea. The magnitude of the build up is demonstrated by comparing the 775 men on strength in June of 1943 to the 11,000 men committed to the 'Hump' airlift by December of 1943.

Approximately 4,500 tons (4037.5 MT) were carried in August of 1943; an amount increased to 12,540 tons (11,421.6 MT) by the following December. Over the course of the airlift, experience led to increased tonnages. In July of 1944 19,050 tons (17,282 MT) were carried and by December of 1944 26,127 flights carried a total 32,000 tons (29,031 MT). By July of 1945, the monthly rate had increased to 71,042 tons (64,449.3 MT). Personnel peaked at approximately 23,000 men at this time.

Although the Japanese were falling back in all other areas of the Pacific War, they were actually advancing in both China and Burma during 1944. C-46s were frequently diverted to move Allied soldiers from one hot spot to another while supporting both regular troops and General Stilwell's special operations forces. The latter included Brigadier General Frank Merrill's Marauders and British Major General Orde Wingate's Chindits.⁴ All the Allied troops were involved in trying to halt Japanese advances and push them back.

In March of 1944 22,000 Chinese troops were airlifted to protect the area and a rail road from Japanese attacks in Burma. By August of 1944, the troops finally captured Myitkyina, an area from where Japanese fighters were harassing the C-46s. Despite Stilwell's successes in

⁴This can be put into perspective by noting 71,042 tons would today require 536 trips by today's Lockheed C-5 Globemaster III aircraft. Marauder were originally called the 'Hell's Composite Unit' their name. The Chindits were named for the lions that stood outside Burmese temples.

A C-46A-45-CU (42-96621) flies over the China-Burma-India (CBI) Theatre during World War Two. The starboard mid-fuselage emergency exit door is left open for improved cabin cooling. This was a frequent occurrence while operating in hot climates and at lower altitudes. In 1957 this Commando crashed in Brazil killing 40 passengers and crew. (Dave Hansen)





A Rubenesque female adorns the nose of this CBI Commando in 1944. The colors of the nose art are unknown. Several C-46s were equipped with glide slope antennas along the port and starboard nose sides. These antennas received radio signals from the landing field indicating the correct glide slope. This information was especially used for landing at night and in bad weather. (John Campbell.)

Burma, the Japanese forces continued to advance in China. By November of 1944, the Japanese were within 400 miles (643.7 km) of Kunming. C-46s then flew in 18,000 Chinese troops in December to reinforce the area.

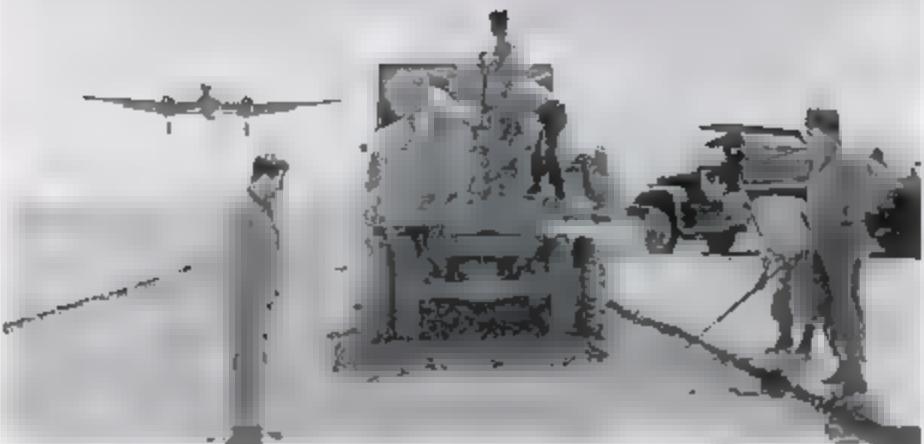
One day in January of 1945 saw more than 500 fully loaded trips into China. This meant a take-off from India every 75 seconds around the clock. Pressure to get the supplies through was so great that General Thomas Hardin of the CBI ordered that there would be no weather over the 'Hump.' Nevertheless, a huge storm front hit the area on 6 January 1945. Operations over the Himalayas were only closed - briefly - after seven C-46s were lost.

Almost 1000 aircraft were destroyed in flying the 500-mile route over the 'Hump.' These losses resulted in the flight path becoming known as the aluminium trail. The rising losses of C-46 and other transports in mid-1943 drove the formation of search and rescue teams. On 2 August 1943, 21 men, including CBS War Correspondent Eric Sevareid, successfully bailed out of a C-46 over northern Burma. The new search and rescue teams found all but one man 16 days later. These search teams flew C-47s and were all armed since many of the rescues went on behind enemy lines. One search aircraft strafed a Japanese airfield and destroyed a Mitsubishi A6M Zero fighter on the ground - the first transport in the CBI created a kill.

By 1945, the war had markedly turned against the Japanese. The Japanese Empire continued to shrink while a never-ending stream of men and materiel continued to flow from Allied nations and factories. C-46 production increased and most continued to flow into the CBI. After VJ Day, Victory over Japan Day, 2 September 1945, the continued supply of China was necessary until the Chinese ports were ready for operation. Consequently, 'Hump' operations continued for a time after the war. The 'Hump' was officially closed on 4 November 1945. Forty-seven thousand US troops were flown to Karachi, India (now in Pakistan) for ship transport home. Of the 650,000 tons of cargo flown into China, approximately half were carried in 1945. The growth in air transport requirements in 1945 made it quite natural that the Chinese Air Force would want their own C-46s since they were familiar with the aircraft. After the war, the USAAF provided C-46s to both China and India. The Indians went west for using their air bases during the war.

November of 1945 saw the end of the world's first major airlift operation. The airlift originated from seven ATC air bases in India's Assam Valley and flew over the Himalayas. This was considered to be the most dangerous, terrifying, and barbarous aerial transport run in the world. The USAAF considered flying the 'Hump' as a combat mission. A pilot had to fly 600 hours and an additional 50 hours in theatre before his rotation back to the states. This was the origin of the Air Transport Command (ATC), which later became the Military Air Transport Service (MATS), the Military Airlift Command (MAC) and - in 1992 - Air Mobility Command (AMC).

The C-46 saw action elsewhere in the world during World War Two. In addition to their missions over the 'Hump', from 1942 Commandos performed ferry operations over the South Atlantic. These flights connected Natal, Brazil, with Accra, Gold Coast (now Ghana) in West Africa, via Ascension Island. C-46 ferry missions lasted until November of 1944, when sufficient Douglas C-54 Skymasters were available for these missions. Several Commandos were delivered to the US 8th Air Force in England in late 1944. These were used for transport operations during the closing months of the European war, including the Rhine River crossing in March of 1945.



Engineers continue work on an airstrip somewhere in the Pacific, while a C-46 is seconds away from landing. The workers unload crushed stone from the dump truck onto the soil, where their colleagues spread it out along the ground. The stone is then covered with either concrete or asphalt to create hard surfaces for runways, taxiways, and hardstands. (Author)

MOBY DICK was a C-46 assigned to the 23rd Fighter Group (FG) in China in July of 1944. The name is painted above a whale of unknown colors, just aft of the cockpit windows. The 23rd FG began as the American Volunteer Group - the Flying Tigers - in the Chinese Air Force in 1941 before it was transferred to the USAAF in 1942. (AAHS)



A crewman stands under the nose of *Double Trouble*, a C-46 somewhere in the CBI in 1944. The Automatic Direction Finder (ADF) football antenna is mounted on the nose undersurface, with both pilot tubes aft of the ADF antenna. This Commando is fitted with the glide slope antenna aft of the nose art. Barely visible 'Hump' mission markings are painted aft of the cockpit. (James Crow)





Groundcrews load a C-46A-41-CU (42-107301) in India for another resupply mission over the 'Hump' in 1944. The serial number is painted on a white tail band, with the last three digits repeated in larger white numbers below this band. This Commando survived World War Two and later operated in South America, before crashing in the Amazon on 4 February 1969. (James Crow)

A C-46A-40-CU (42-107342) is parked in front of a maintenance shed at Chabua, India in 1944. Chabua in the Assam region of northern India, was one of the primary bases for Commandos in the CBI. The ATC insignia is painted off the fuselage national insignia, while CHABUA is in yellow on the upper vertical stabilizer. (James Crow)



This C-46D-10-CU (44-77824), Queen Lili, rests after a landing mishap in the spring of 1945. The Commando overran the runway, shearing off the port engine and landing gear; however, the starboard propeller is intact. This aircraft was repaired and returned to service. B-24 Liberators of the 90th Bombardment Group are parked in the background. (James Crow)

A C-46 overshot the runway and ended up in an Indian tea field in 1944. The bent propeller blade tips indicated that this Commando probably nosed over at some point in this landing. Although the paint is well worn from flying many Hump missions, the C-46's sturdy construction meant that this aircraft was soon back in service. (James Crow)





A bare metal C-46A-40-CU (42-101052) is parked near a maintenance shed in India in 1944. Late production Commandos were delivered to the USAAF without camouflage, which added weight to the aircraft and slightly reduced its speed. Maintenance in the CBI was often done at night, due to the high heat in the day. (James Crow)



Marine Lieutenant Tyrone Power piloted this B-29 based at Saipan in the Marianas in 1944. He was among many film stars serving in the US armed forces during World War Two. The Boeing B-29 Superfortresses in the background (behind the C-46 in tall) were assigned to the 40th Bombardment Group, 58th Bombardment Wing. (James Crow)

Soldiers unload cargo from a C-46 at Kunming, China in 1944, following another supply flight over the 'Hump' from India. The Commando's crew opened several windows and hatches after landing to help cool the cabin on this hot day. Some Olive Drab and Neutral Gray paint is worn away from the nose, which indicated the stress on a well-used C-46. Immedately after the cargo was unloaded, ground crews at Kunming refueled the aircraft and performed service checks, while aircrews ate fried eggs and drank coffee. One hour after landing at Kunming, the C-46 took off on the return trip to India. Total round trip flight time was approximately six to eight hours. Flight crews were rotated home after 650 flight hours on 'Hump' operations. (John Campbell)





Nose art was not as predominate on cargo transports as it was on combat aircraft, but nose art did appear frequently, especially earlier in the war. This beautiful pinup graced the nose of *The WIDOW MAKER*, a CBI C-46 in 1944. Colors of the art and lettering are unknown. (John Campbell)

A suggestively posed blonde is painted under the cockpit windows of *BURMA*, a Commando that flew over that country in 1944. This name is believed to be painted in the same flat Orange Yellow color used for the code X706 on the upper nose. The reason for the code X706 is unknown. (James Crow)



A dark haired nude woman is painted on *Gone Forever*, another C-46 assigned to "Hump" operations. A winged cherry bomb is painted below the letter X on the nose, but its significance is unknown. Form-fitting covers kept the pilot tubes clean between flights. (Author)

LONG DISTANCE, and a nude woman are painted on the nose of this C-46 at Wainwright Field on Los Negros in the Philippines in 1944. Unit artists often based their nose art on pinup pictures in magazines and their imaginations. This Commando is equipped with a loop-shaped Direction Finding (DF) antenna on the upper nose. The antenna rotated to acquire radio navigation signals. (James Crow)





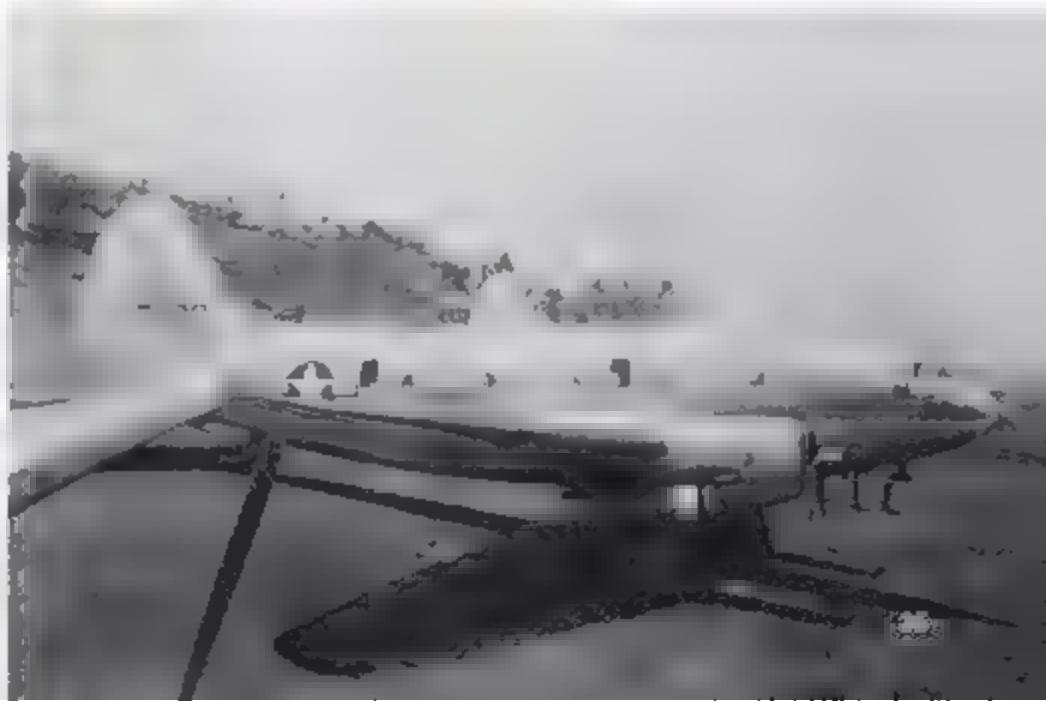
A woman's head and a nude female are painted on *Spook Chaser*, a C-46 assigned to the CBI Theatre in 1944. It is unknown what colors were used on this art. Suggestive artwork was often touched up or otherwise covered when important visitors arrived at airfields. (James Crow)

This C-46D-15-CU (44-78321) taxies out at an airfield in the Philippine Islands in 1945. The starboard passenger door is located immediately in front of the fuselage national insignia. Interiors of camouflaged aircraft were hot places during daytime in the tropics. Another Commando parked alongside the runway has its main cargo door open. (James Crow)



A pilot leans out the window of JOAN, a C-46A based in India's Assam region in early 1945. The white diamond on the lower nose held the last four digits of the serial number and assisted with identifying specific aircraft while on the ground. A fixed landing light is mounted on the lower half of the nose cone on all C-46s. (James Crow)

A Louisville-built C-46A-50-CK (43-47262) sits on the flight line at Chengkung, China – southeast of Kunming – in the summer of 1945. The starboard hatches are opened to ventilate the cabin interior. This natural metal Commando is plainly marked with national insignia, ATC emblem, and black tail numbers. (James Crow)



Post-War Military Service

On 14 April 1945 C-46A-60-CK 43-47271 left the Curtiss Louisville plant for Fairbanks, Alaska. It was then transferred to the Soviet Air Force on 15 May 1945. It was the only C-46 given to the Soviet Union. It was later used at the NII VVS in Moscow into the late 1940s.

A significant number of C-46s were delivered to the US 8th Air Force in Europe late in 1944 and early in 1945, but the war in Europe ended before much use could be made of C-46s. After the war they were ferried back to the United States and declared surplus. Many C-46s in Africa were also returned to the United States, however, some were left near Cairo. In April 1946 approximately 30 Commandos were obtained by Brazil's Vung Airlines in 1952 and 1953 but only some of these flew to Brazil. Others required overhaul or were dismantled for spares.

The end of the war in Japan terminated C-46 production contracts, but hundreds of new C-46s were spread all over the world. The Chinese government purchased the entire surplus stock of C-46s in the Chinese mainland. When Generalissimo Chiang Kai-shek and his Nationalist government were forced out of China by the Communists in 1949, the Nationalists moved to Formosa (now Taiwan) and took most of the Chinese C-46s with them. A few aircraft fell into Red Communist Chinese hands and these were later used to support Red Chinese troops in North Korea. The USAF supported dozens of C-46s in the Republic of South Korea Air Force. This meant Commandos flew with both sides during the Korean War of 1950-53.

A major support of the United Nations UN forces in South Korea came through Japan. This resulted in the US delivering approximately 50 C-46s to the Air Transport Wing of the Japan Air Self Defense Force (JASDF). Seven Japanese Commandos were later converted to VIP transports, navigation trainers, and Electronic Countermeasures ECM aircraft. The JASDF retired its last two C-46s in May of 1978.

Most of the older C-46s left in the China-Burma-India (CBI) Theatre at war's end were broken up on the spot. The age and worn state of these aircraft made the cost of ferrying them back to the US prohibitive. On 10 April 1946 approximately 40 newer C-46s were either sold or given to the Indian Government. This would have also been payment of the rent of various air bases in India during the Hump operations. India began selling these C-46s in 1958.

When the US signed the Rio Pact mutual defense treaty in 1947, they supplied numerous C-46s to several Latin American countries. Bolivia used four Commandos for TAM *Transportes Aéreos Militares* (Military Air Transport), the Bolivian Air Force's paramilitary arm. At least one C-46 went to Cuba, at least four to the Dominican Republic, and 20 were supplied to Peru. Mexico acquired some C-46s and later obtained others through drug aircraft confiscation. Brazil also flew several C-46s in the Middle East. Egypt and Israel operated several Commandos in the late 1940s and early 1950s.

The US military continued to operate the modified C-46s in the post World War Two period. The USAF's Combat Cargo Command flew Commandos during the Korean conflict and C-46s saw Air Force Reserve and Air National Guard service well into the 1960s. The 1st Air Commando Group operated C-46s in clandestine counter-insurgency operations in Southeast Asia in the 1960s. This unit was later transferred to the Panama Canal Zone, where the last examples were retired in 1972 after over 30 years of service to the US military. This is not bad for an aircraft designed as an air-tractor. The C-46 Commando was designed and built so strong that it had a structural life of approximately 50,000 hours.

NII VVS, *Naučno-tekhnicheskij Institut Voenno-Vozdushnykh Sил* - Scientific and Research Institute of the Military Air Forces

²The Rio Pact, named for Rio de Janeiro, Brazil, where the agreement was signed, is formally called the Inter-American Treaty of Reciprocal Assistance.



The only Commando sent to the Soviet Union was this C-46A-60-CK (43-47271). It was ferried to Russia via Alaska on 15 May 1945. The aircraft flew on trial work with the Scientific and Research Institute of the Military Air Forces (NII VVS) in the late 1940s. Soviet red stars trimmed white and red were painted on the fuselage and wings. (G. F. Petrov via George Mellinger)

The Chinese Air Force acquired many surplus C-46s from the US after World War Two. Chinese flight and ground crews were highly familiar with the Commando from its wartime supply flights from India. Blue and white stripes were painted on the rudders, while the blue and white Chinese national insignia appeared on the wings and fuselage. (Dave Hansen)





The Chinese assigned the serial number C-48289 to this C-46D. The small white number is painted on the vertical stabilizer. Chinese Commandos were painted a flat dark green, with Neutral Gray undersurfaces. The tail of another C-46D appears under the Commando's nose. (Dave Hansen)

Supplies are being loaded onto a Republic of China (Taiwan) Air Force C-46D (C-46308/44-78047) at Tachikawa Air Base, Japan in the early 1950s. Both serial numbers - Chinese and US - were painted on the vertical stabilizer, with the Chinese number's last four digits repeated in larger numbers. A unit insignia is painted high on the fin. (Wayne Mutza)



A C-46F 1-CJ (44-78627) is parked at the end of a line of Commandos for China outside Curtiss Buffalo plant in mid-1945. The C-46F reverted to the faired-in windshield of the C-46A/D, but used the C-46E's squared off wingtips. This Commando was flown to Karachi, India (now Pakistan) in August of 1945, but crashed on its delivery flight to China on 12 August 1945. (Dave Hansen)

A Chinese Nationalist C-46D-10-CU (C-46261/44-77820) is parked at an airfield in Taiwan during the early 1950s. The blue and white rudder stripes were deleted from camouflaged Taiwanese aircraft by this time. The Chinese serial number is painted on a tail band, which is believed to be red. (Rick Wargo)





This C-46D is one of at least two Commandos on display at Datang Shan Aviation Museum in China. The aircraft is believed to be one of the C-46s left behind when the Nationalist left the Chinese mainland for Formosa (Taiwan) in 1949. This aircraft is painted with the red and yellow Chinese People's Liberation Army Air Force (PLAAF) insignia. (Rick Wargo)



A C-46D-10-CU (44-77896) assigned to the Republic of Korea Air Force (ROKAF) rests between missions at a South Korean air base. It is believed that the ROKAF flew no more than 30 Commandos supplied by the US in the early 1950s but the exact figure is unknown. (Rick Wargo)

This former USAF C-46D was one of 48 Commandos delivered to the Japan Air Self-Defense Force (JASDF) in the 1950s. The Japanese serial 51-1106 replaced the aircraft's USAF serial number (44-78025). Orange trim is painted on the nose and aft fuselage. This C-46D was retired in 1977 with nearly 11,000 flight hours. (Dave Hansen)





The other JASDF EC-46D was this aircraft (91-1140), which was built as a C-46A-50-CU (42-101235). This aircraft flew 'Hump' missions during World War Two before its transfer to the Chinese Air Force on 15 April 1946. The Japanese acquired it from Taiwan in the 1950s. The tail flash is (from top) red, yellow, and blue. (Rick Wargo)

This C-46 (610) was one of at least two Commandos in Cuban service when Fidel Castro took power on 1 January 1959. The aircraft's former US serial number is unknown. The title ESCUADRÓN DE TRANSPORTE is painted above the fuselage windows, while FAR (Fuerza Aérea Revolucionaria: Revolutionary Air Force) is painted on the port wing undersurface. (Rick Wargo)



Among the Latin American air forces to operate C-46s during the post-war period was that of the Dominican Republic. The *Escuadrón de Transporte* (Transport Squadron), Fuerza Aérea Dominicana (FAD: Dominican Air Force) flew this aircraft (302) and at least four other C-46s. The aircraft's upper fuselage is painted white to cool the interior, while an orange band is painted on the aft fuselage. (Dr Gary Kuhn)

An Israel Defense Force/Air Force (IDF/AF) C-46 flies low over the Mediterranean coast in the late 1940s. A handful of Commandos were delivered to Israel during its 1948-49 War of Independence. They served in transport and makeshift bombing roles during the conflict and served into the early 1950s. (Israeli Air Force Magazine)





This C-46E-1-CS (43-47410) was assigned to the USAAF's All-Weather Flying Center at Clinton County Army Air Field, Ohio in 1946. Its nose, wingtips, and tail were Insignia Red and Orange Yellow. In 1947 this Commando was declared surplus and sold to Trans National Airlines. The aircraft crashed 30 miles (48.3 km) west of Los Angeles on 12 July 1948, killing 35 of the 48 people aboard. (Wayne Mutza)



A C-46D-20-CU (44-78464) flies off the coast of Japan during the late 1940s or early 1950s. The open passenger and cargo doors were likely to cool the interior while flying at low altitudes. It was assigned to the Pacific theatre during World War Two and remained there after the conflict. The JASDF acquired the C-46 and assigned the serial number 61-1112. It accumulated nearly 10,000 flight hours before its withdrawal from service in 1973. (Author)



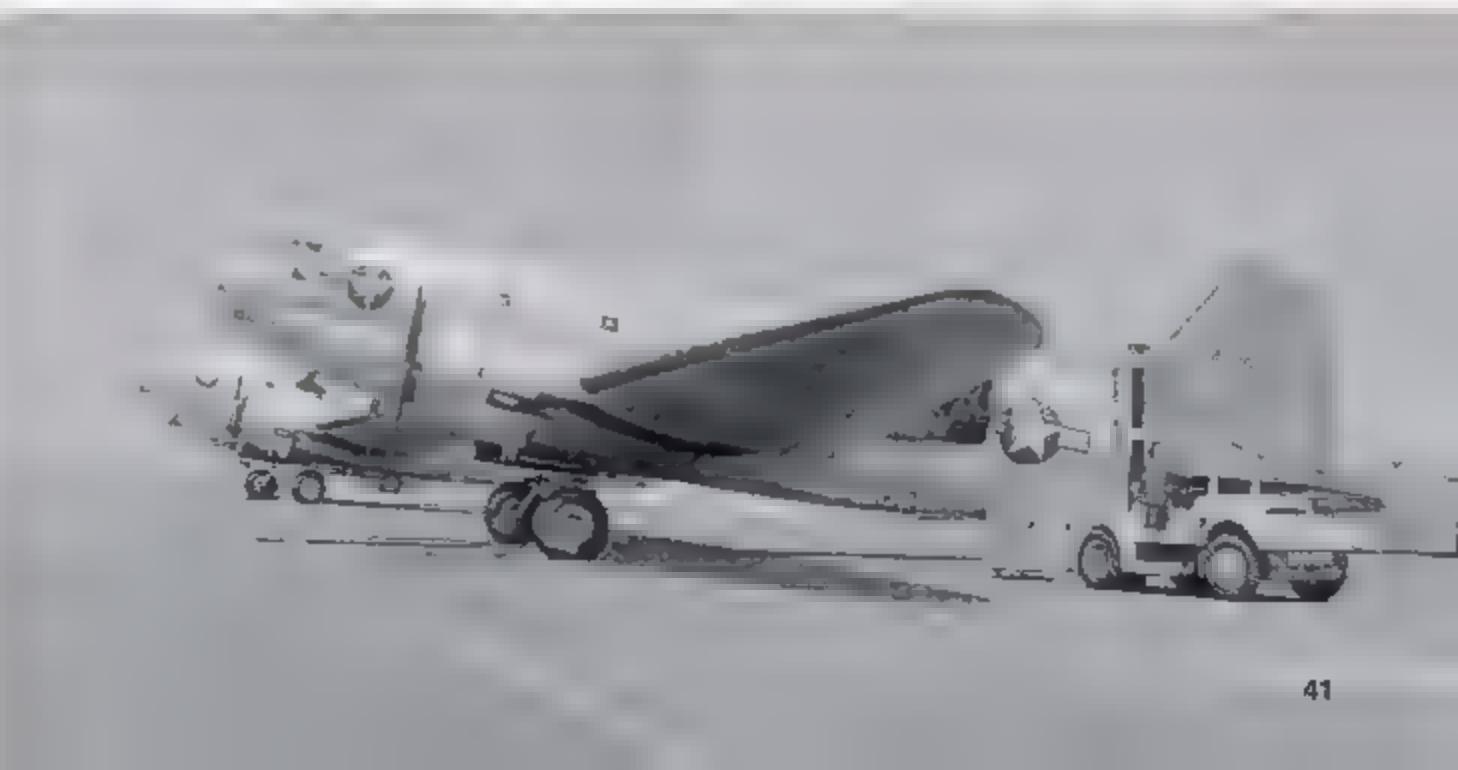
A well-worn C-46F-1-CU Commando (44-78674) visits the 125th Fighter Squadron, Oklahoma Air National Guard (ANG) in Tulsa, Ok in 1947. It is still wearing its wartime color scheme of Olive Drab upper surfaces and Neutral Gray undersurfaces. The colors have faded from exposure to the elements. The red center bar in the national insignia was added on 14 January 1947. In 1958, Riddle Airlines of Miami converted this Commando into a C-46R with tip tanks. This aircraft subsequently flew with various Alaskan and Canadian airlines until it crashed in the Yukon in January of 1973. (AAHS)



A C-46D-15-CU (44-78049) is parked on the hardstand of an airfield in Alaska during the early 1950s. UNITED STATES AIR FORCE is painted in small Insignia Blue (FS15044) letters above the fuselage windows. The wingtips and tail were painted Glossy Insignia Red (FS11138) for improved visibility in Arctic conditions. In 1959, this Commando was sold to a Panamanian cargo carrier and the aircraft crashed on 18 July 1969. (Rick Wargo)



The flaps are fully lowered to 35 on this C-46D-10-CU (44-77696) in 1952. The Commando was flying cargo in Japan and Korea. The wing walks are Flat Black, while USAF on the starboard wing is Insignia Blue. This aircraft previously served with the JSAAF in the Pacific during World War Two and was later transferred to South Korea who assigned it the serial number 0-7696. (Dave Hansen)

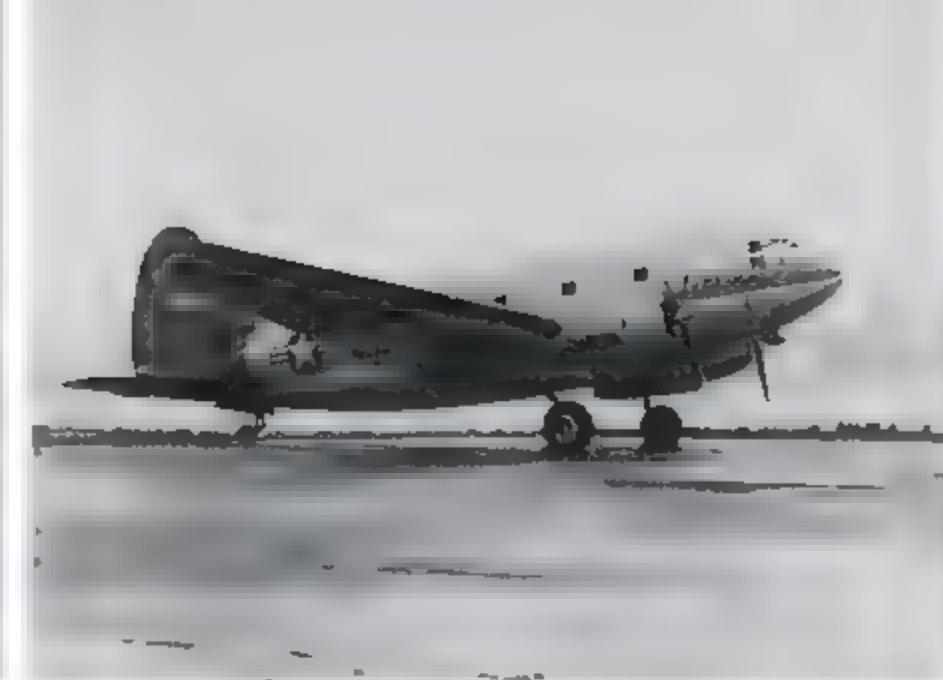


A flight equipment trainer for the Northrop F-89 Scorpion night fighter is loaded onto this C-46D-15-CU (44-78019) at Palmdale, California in April of 1954. This natural metal aircraft is painted with the Insignia Red wingtips and tail associated with Arctic operations. The USAF title on the port wing undersurface and the tail number are Insignia Blue on an Aluminum background. Two diagonal white stripes are painted on the top of the vertical tail. The area immediately aft of the engine exhaust is black to hide the exhaust stains. The USAF Training Command insignia is painted aft of the cockpit windows. In 1965, this C-46D was declared surplus to USAF requirements. Ten years later, it went on display at the Pima County Air Museum near Tucson, Arizona. (Gerry Balzer)



A C-46A-45-CU (42-96529) is displayed at an air show in the early 1950s. This bare metal aircraft has UNITED STATES AIR FORCE above the fuselage windows and TROOP CARRIER below these windows. The entire lower engine nacelle aft of the cowling is black. (AAHS)

The 10th Air Force Insignia is painted on the vertical tail of this C-46A (42-107294) during the mid-1950s. The tail tip and nose are red, while the undersurfaces are Glossy Black (FS17038) for nighttime resupply missions. The large U.S. AIR FORCE title on the forward fuselage was in standard use by this time. (Rick Wargo)



Painted with Insignia Red tail and wingtips, this C-46D-10-CU (44-77825) was assigned to the 183rd Fighter Group (FG), Illinois ANG at Springfield, Illinois. The guard unit flew this Commando for personnel and cargo transport from the late 1940s. In 1959 the C-46D was declared surplus and sold to a cargo airline in Brazil. (Fred Roos)

Boeing used this C-46F-1-CU (44-78670), NOAH'S ARK, for air-to-air photography during the 1950s. A bubble-type window for photography replaced one of the port side windows. The upper fuselage and vertical tail were painted white to cool the interior. Full USAF markings were retained while operated by Boeing. (Dave Hansen)





This C-46D-10-CU (44-77882) was a World War Two veteran and served in the post-war USAF. In 1956, the Commando was assigned to the Ogden Air Materiel Area (OOAMA; now Ogden Air Logistics Center) at Hill AFB, Utah. The blue and yellow OOAMA arrowhead is painted on the Commando's red tail. (Rick Wargo)



The 143rd Air Resupply Squadron, Rhode Island ANG flew this C-46D-15-CU (44-77949) from T.F. Green Airport in Warwick, Rhode Island from 1956 until 1959. This natural metal aircraft has black fuselage and nacelle undersurfaces. The Commando was declared surplus in 1959, when it was sold and flew with Colombia & Lineas Aereas del Caribe until 1976. (Rick Wargo)



This C-46D-10-CU (44-77578) was assigned to the 14th Air Force during the 1950s. The Air Force insignia is painted on the upper vertical tail, while the fin tip is red. This Commando is believed to have been used as a staff transport for high ranking 14th Air Force personnel. The bare metal skin is highly polished and the upper fuselage is painted white for interior cooling purposes. It has an Insignia Blue fuselage cheat line separating the white and bare metal sections, while the nose cone is red. The USAF declared this C-46D surplus in 1959. (Fred Roos)



This 10th Air Force C-46D-15-CU (44-77951) is parked on the transient ramp at Van Nuys Airport, California in 1957. This airport was home to the 115th Fighter-Bomber Squadron, California ANG at the time. The Curtiss Electric variable pitch propellers are feathered, the

usual pitch selection when an engine goes out in flight and the pilot does not want a windmilling propeller. (Dick Phillips)

This red-tailed C-46D-10-CU (44-77625) flew with the Illinois ANG at Springfield, Illinois in the early 1950s. ANG was painted above the tail number and both items are Insignia Blue on an Aluminum panel. The Commando was withdrawn from ANG service in 1959 and sold to Vanguard Export Corporation two years later. It operated in South America during the early 1960s. (Rick Wargo)

This colorfully painted C-46D-10-CU (44-77619) was assigned to the 130th Troop Carrier Squadron, West Virginia ANG during the 1950s. It had black undersurfaces. Aluminum tail, while upper fuselage and red cheatline. The Squadron converted this C-46D into a TC 46D trainer. It was declared surplus in 1959 and sold two years later. The Commando crashed in South America on 24 March 1965. (Rick Wargo)



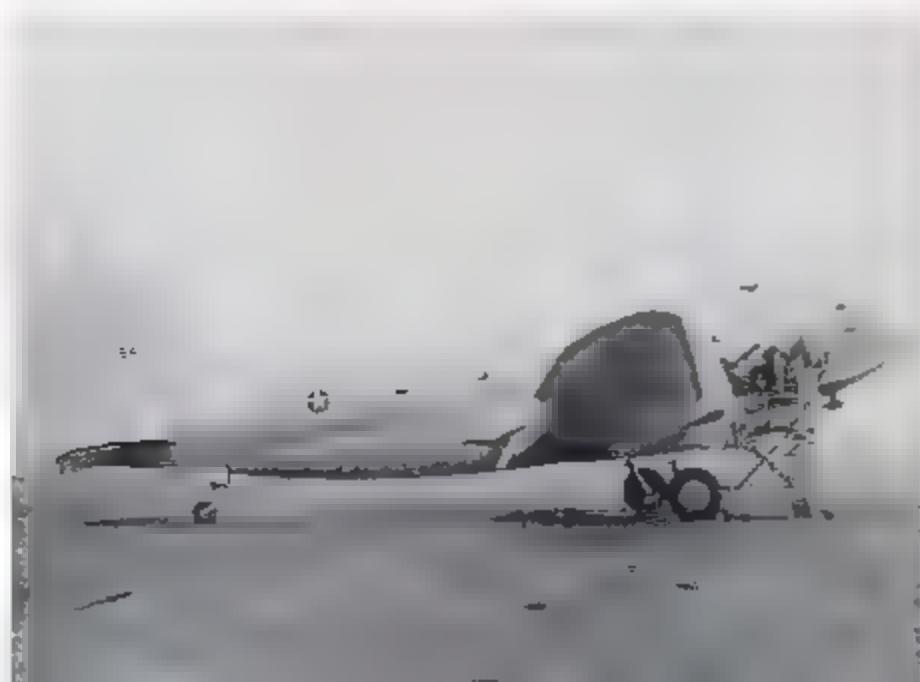


The US Army flew this C-46F-1-CU (44-78647) on airborne systems research on behalf of the University of Michigan during the late 1960s. A sensor pod was mounted on the fuselage undersurface. The Commando is parked at Willow Run Airport near Detroit, Michigan on 20 March 1968. After 1971, the Environmental Research Institute flew this C-46. (Fred Roos)

Maintenance is being performed on the starboard engine of this C-46D-10-CU (44-77541). The overall COIN Gray Commando was flown on covert missions in Southeast Asia and the Caribbean during the 1980s. Only the last three digits of the serial number (541) are painted on the vertical stabilizer. (Rick Wargo)



The 605th Air Commando Squadron (ACS) flew this C-46D-10-CU (44-77766) from Howard AB, Panama Canal Zone during the 1980s. The Commando is painted overall COIN (Counter-insurgency) Gray (FS36473) with no markings on the wings. It logged nearly 11,000 flight hours before it was sold to the Republic of Korea Air Force in 1988. (Author) This restored C-46D-5-CU (42-101198) is displayed at Warner-Robins AFB, Georgia. Named GEORGIA PEACH, it has a large ATC insignia on the nose and a standard sized emblem on the aft fuselage. This Commando flew in the CBI during World War Two before its sale to the Indian Government in April of 1948. In 1954, it returned to America before flying cargo in Chile and later restoration in America. (Dave Hansen)



Post-War Civil Use

When World War Two ended, American aircraft manufacturers began searching for aircraft to manufacture in order to keep at least some of their wartime production facilities in operation. Curtiss proposed a civilian development of the C-46, the CW-20E. Eastern Airlines ordered approximately 25 CW-20Es in late 1945, while National Airlines also expressed interest in this aircraft. Curtiss completed certification of the C-46E in preparation for civilian production. In February of 1946, Eastern canceled its CW-20E order and this ended Curtiss' interest in the aircraft. The primary reason for this cancellation was the large number of low time Douglas C-47s (DC-3s) and C-54s (DC-4s) on the market at highly economical prices. Additionally, Lockheed was building the L-049 Constellation at the same time. The C-46 was not wanted for passenger airline service, but its wartime cargo hauling experience made it highly desirable for post-war cargo airlines.

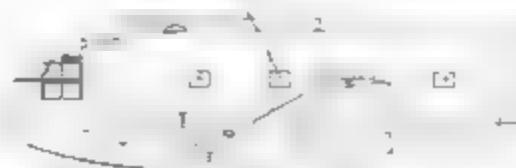
Numerous entrepreneurs wanted to start up their own non-scheduled cargo airline and the Commando was most attractive to them. War surplus C-46s were practically new with few flight hours and they were highly inexpensive. Among the cargo carriers that began with C-46s were Flying Tiger Line, World Airlines, Capitol Airlines and Slick Airways. By August of 1948, there were at least 142 large irregular cargo carriers registered with the Civil Aeronautics Administration (CAA). The C-46's cavernous cargo hold made it easy to exceed its gross weight limit. This resulted in the CAA (later the Federal Aviation Administration or FAA) cracking down on poor maintenance and unsafe procedures. The well-run cargo airlines survived with their C-46s.

Slick Airways of San Antonio, Texas was the first major US carrier to operate C-46s. It was formed in January of 1946 and founder Sam F. Slick bought six C-46s intended for lend-lease to China. Some of these aircraft were finished in their Chinese markings, including blue and white rudder stripes, which Slick kept as part of his own livery. The CAA certified Slick's C-46Es for civil use and the airline obtained more Commandos.

Civil operators needed to make several modifications to military C-46s before they were

C-46A/D

Four Passenger Windows
(Port & Starboard)

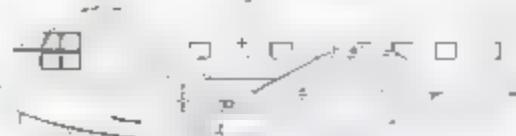


Standard Engine Cowling
and Intakes



Upper and Lower Aft
Fuselage Stiffeners (Port &
Starboard)

Super 46 Nine Passenger Windows
(Port & Starboard)



Modified Engine Cowling
and Intakes



Lower Aft Fuselage
Stiffeners Removed (Port &
Starboard)



Flying Tiger Line modified this C-46F-1-CU (N67979, formerly 44-78757) with a 350 pound thrust Turboméca Palas turbojet engine in 1952. The jet engine was added to provide additional power for cargo flights to and from high altitude destinations. Flying Tiger did not adopt this boosted power on an operational basis and the Commando later went to South America. (Gerry Balzer)

Capitol Airways flew this C-46D-10-CU (N9893Z, formerly 44-77574) from March of 1948. The Nashville, Tennessee-based carrier flew 50 Commandos on charter cargo operations. After operating with Capitol and other cargo carriers, this C-46D was scrapped in Ohio in the mid-1970s. (Author)



approved it for airline service. On 7 April 1947, the CAA approved several modifications proposed by Robert Prescott who formed Flying Tiger Inc. in June 1945. He formed this contract freight carrier with several other former Hump' pilots. The CAA issued an Approved Type Certificate, ATC-772, which allowed the C-46s to enter service with US and other air lines throughout the world. While C-46 carriers spread across the globe, more efforts were made to improve the Commando's performance. The Aircraft Engineering Foundation, a non-profit cooperative of C-46 operators developed several modifications for this Curtiss transport from 1955. This modified aircraft was called the Super 46 and featured redesigned engine nacelles, improved oil and carburetor air intakes, and anti-skid brakes. These modifications resulted in an increase of 200 HP per engine, to 2200 HP for each engine. The added power improved the Super 46's cruise speed by 19 MPH (30.6 KMH) over standard C-46s (243 MPH, 393.4 KMH). The maximum passenger operation weight increased from 45,300 pounds (20,548 KG) in the C-46 to 47,000 pounds (21,319.2 KG) in the Super 46. Simultaneously the L.B. Smith Aircraft Corporation of Miami, Florida developed other modifications for C-46s. These included installing 2100 HP R-2800-C radial engines and modifying the nacelle and intake ducts. The modified Commando could carry up to 55 passengers at a maximum weight of 47,650 pounds (21,614 KG) and cruised at 277 MPH (445.8 KMH). L.B. Smith marketed this variant as the CW-20T (T for US Transport-category regulations), which received its certification on 20 March 1948.

Miami-based Riddle Airlines was another post-war C-46 operator. In 1956-57, this firm developed the C-46R, R = Riddle, which replaced the fabric-covered control surfaces (rudder, elevators, and ailerons) with metal-covered surfaces. Riddle made these and other minor changes to the 42 C-46s they operated and also modified Commandos flown by other cargo carriers. These changes extended the C-46's active life by many years.

China was another country where C-46s winged their way with post-war cargo operators. Chinese businessmen were quite familiar with Hump' operations and surplus low-time C-46s at excellent prices were available and were already in use near China. Retired American General Claire Chennault formed C-46 Air Transport (CAT) soon after World War Two ended and obtained dozens of Commandos for his firm. Chennault's aircraft flew cargo and passengers from the Chinese coast to inland areas. Other Chinese airlines began during this period with surplus C-46s. CAT and the other operators moved their Commandos to Formosa (Taiwan) when Mao Tse-tung's Communists took over China in October of 1949.

Terrain - including the jungle, swamps, the Amazon River, and the Andes Mountains - hindered surface transportation in many South American countries. This situation made the C-46 ideal for cargo flights in Brazil, Argentina, Bolivia, Peru, and Chile. These countries had domestic cargo airlines that were an essential part of their distribution networks. Perishable food was the primary cargo for these aircraft. Most Central and South American countries depended almost exclusively on the US for manufactured goods. Many of these items were flown from the US - particularly from Miami and Houston - to Latin America on C-46s. Several Commandos remain in service in Latin America today.

Numerous proprietary air lines were formed and operated in Southeast Asia during the 1950s, 1960s, and 1970s using C-46s. These air lines - including Blue and Sons, Continental Air Services, Inc. (CAS), CAT, and Air Americas - were operated by and for the Central Intelligence Agency (CIA). The Commandos flew passenger and cargo services often in support of CIA covert operations in the region.

Since 1946, nearly 350 different operators have flown C-46s in a commercial role. These operators have ranged from small companies with only one or two Commandos to large air lines like Delta and Braniff with large fleets of these aircraft. Most of the Commando's post-war civilian use was for freight hauling rather than passenger service. In the former role, the C-46 dominated air freight for more than 60 years of flying cargo and freight around the world.

CAT later became Air America, an organization owned and operated by the Central Intelligence Agency (CIA).



The next-to-last C-46E built was this aircraft (43-47418), which was intended for lend-lease supply to China. Instead Slick Airways acquired the aircraft on 29 December 1945. It was registered NC59486 and used for cargo work. The Commando crashed with two people killed in Denver, Colorado on 14 February 1947. (Dick Phillips)

A Riddle Airlines C-46F (N74179, formerly 44-78776) is parked between flights in 1960. This Commando was one of the last C-46s built in 1945. After service with Riddle the aircraft flew with Pan American, Zentop, and Air Laos, where its registration disappeared and its ultimate fate is unknown. (Dave Hansen)





Delta Air Lines flew this C-46D-10-CU (N9884F, formerly 44-77736) on cargo operations between 1 October 1957 until 30 January 1967. The Commando was originally delivered to the USAAF on 20 January 1945. After service in the Pacific, the C-46D was acquired by Civil Air Transport (CAT) in China before returning to the US. In 1967, Delta sold N9884F to a freight carrier in the Congo, who registered it as 9Q-CZF. (John Campbell)

Civil Air Transport (CAT) purchased many surplus Commandos after World War Two, including this C-46D-20-CU (B-860, formerly 44-78413). Gen Claire Chennault founded CAT to fly passengers and supplies throughout China. Air America acquired CAT during the 1950s and this C-46's registrations changed frequently in Air America service. (Author)



This US Border Patrol C-46F-1-CU (N1874C, formerly 44-78777) is parked at an airport in 1963. It was converted to Super 46 configuration with improved engine oil and carburetor intakes and redesigned nacelles. After Border Patrol service, this Commando was acquired by Everts Air Fuel in Fairbanks, Alaska, who still flies it on cargo missions. (AAHS)

One of the original C-46s in CAT service was this aircraft (B-840), whose original USAAF serial number is unknown. CAT aircraft originally had XT civil registration numbers, whose prefix was changed to B after December of 1949. A Taiwanese (Chinese Nationalist) flag is painted on the tail. B-840 later flew with Air America in Southeast Asia. (Wayne Mutza)





This Taiwanese-registered Air America C-46D-20-CU (B-858, originally 44-78405) is parked at Kunsan, South Korea (K-8) during the mid-1960s. Air America, a CIA-operated airline, obtained this Commando when it acquired CAT. The aircraft was one of the original C-46s CAT bought from US surplus shortly after World War Two. (Robert Milkash)

An Air America C-46F-1-CU (B-145, originally 44-78638) taxis out for another mission from Da Nang AB, South Vietnam in December of 1966. The Commando flew passenger and cargo services throughout Southeast Asia during the Vietnam War. These missions included support of CIA-backed covert actions in the region. (Tom Hansen)



An Air America crew pushes bags of rice out of a C-46 during an airdrop resupply mission over Laos. The bags were tied to a pallet, which traveled on a roller ramp fitted to the cargo bay floor. The two crewmen wear parachutes on their backs as a precaution in case they fell out of the aircraft while pushing out the rice. Air America delivered supplies to pro-US forces in Laos, who were fighting the Communist Pathet Lao forces. (Author)

Wings of the CBI

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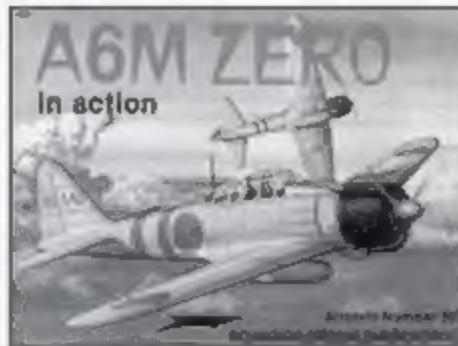
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Don Greer

(Above) A C-46A (41-24698) assigned to Air Transport Command (ATC) lands at Kunming, China in late 1943. The Commando is completing a supply flight over 'The Hump' from India. The ATC insignia is painted on the C-46's aft fuselage, near the tail.

(Below) A natural metal R5C-1 (BuNo 39507) warms up its engines prior to a flight from Naval Air Station (NAS) Corpus Christi, Texas in the late 1940s. This Commando was among 180 C-46As ordered on behalf of the US Marine Corps during World War Two.



ISBN 0-89747-452-X
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